Introductory Notes Concerning
Draft Congestion Management White Paper Package

The attached papers describe options under the "convergence" congestion management framework recently proposed by the RTO West Filing Utilities. The "convergence" congestion management is based on a combination of voluntary decisions and positive incentives designed to balance protection of existing rights with the need for a new, more liquid market structure. Among the voluntary aspects of the framework is the ability of Participating Transmission Owners (PTOs) to elect whether to: (a) convert their pre-existing contracts and load service obligations, which would provide them with Financial Transmission Options (FTOs); or (b) continue to hold their pre-existing transmission contract rights and load service obligations.

The "convergence" congestion management proposal allows RTO West to provide service on behalf of PTOs for pre-existing contracts and load service obligations on an aggregated basis as "catalogued" transmission service. To support this aggregated obligation, the PTOs would commit to supply RTO West with the necessary transmission capacity, rights, and services. Today, some transmission obligations require the transmission provider to redispatch generation for congestion relief. The "convergence" proposal intends to preserve this commitment to the catalogued services.

The Filing Utilities have been considering two approaches to implementing PTO redispatch obligations. One approach allows each PTO to provide an agreed level of redispatch service using its own physical generators when needed to meet CTR obligations. In the other approach the PTO commits to an agreed share of the cost of congestion incurred by RTO West to make good on CTR obligations. At this point, the Filing Utilities have not come to a conclusion as to which approach best serves the overall purposes of the congestion management approach. We need to do further development and analysis.

Both approaches are described separately in the attached papers. The Filing Utilities believed that it would be more helpful for all interested parties to see the two approaches presented as integrated, internally consistent descriptions rather than as parallel concepts within a single paper.

The Filing Utilities welcome the input of stakeholders and other interested parties as to which of the two proposals would best meet the underlying objectives of the "convergence" congestion management proposal and serve the interests of the region encompassed by RTO West.

RTO West:

Transmission System Congestion Management

Preliminary Discussion Draft – Methodology A

December 14, 2001

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RTO West Congestion Management

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RTO West - Congestion Management

Introductory Notes:

This draft white paper represents a work in progress. The purpose of releasing a draft at this time is to enable interested parties to get a sense of how work to date on a Stage 2 congestion management proposal is taking shape.

This congestion management proposal described in this draft white paper has, so far, been developed independently of work on a revised Stage 2 pricing proposal. The process of making sure that the congestion management proposal and the pricing proposal mesh smoothly with each other is yet to come, so there may be inconsistencies.

[Add more text that this does not represent anyone's agreement to go forward on this basis or support for the proposal in its entirety or an particular element; where a particular disagreement or concern is noted, it does not indicate that the disagreeing or concerned party accepts the balance of the proposal.]

Goal – opportunity to enable evaluation as a package that is intended to be internally consistent – reserve right to comment later on

1. Introduction

[***NOTE: the material shown in strikeout below in section 1 probably should be shifted to the FERC filing letter rather than kept here in the description of the congestion management model.***]

1.1. Overview of Proposed Congestion Management Approach.

The approach described below is not based on physical scheduling rights across flowgates, but instead reflects a system of financial rights tied to particular points of injection and withdrawal on the RTO West transmission system.

The approach is based on a combination of voluntary decisions and positive incentives designed to balance protection of existing uses/rights with the need for a new, more liquid market structure. This approach recognizes that an acceptable congestion management model must not interfere with ability to serve load reliably or cause involuntary price shocks.

For those participants who view increased liquidity in transmission markets as critical to the success of an RTO, there are specific assessments and tools to enable RTO West to promote release of unscheduled capacity into the primary or secondary trading markets. For those that believe that moving to a more market-based congestion management approach should not

increase price risk to loads that have paid for existing rights and facilities, the decision to convert existing contract rights is completely voluntary. At the same time, the approach described below contemplates that there will be incentives to promote voluntary conversion of existing rights into tradable financial rights, so that more capacity will be available in secondary markets.

1.1.1. "Accept all schedule requests "

All transmission users will be allowed to "schedule" their energy transactions with RTO West. RTO West will receive these schedules and using a security constrained least cost economic analysis, RTO West will determine if transmission congestion is anticipated and take least cost actions to accommodate schedules that are willing to pay for the congestion cost.

1.1.2. Financial Hedge

This congestion management approach is a model where the tradable product is a financial congestion hedge. That is, the transmission right is an "option" or credit against congestion costs incurred in the hour. This credit will not turn negative and results in additional costs to holder of the Financial Transmission Option (FTO). [clarify sentence]

1.2. Seamless West-wide Congestion Management Framework

We recognize that this congestion scheme must inteface with and be coordinated with transactions between and operations in neighboring RTOs. This is covered in more detail in Section 8.

1.3. Relationship to other RTO processes

1.3.1. Pricing

This congestion management scheme is designed to be at least revenue neutral. That is, over time, the overall cost of managing congestion should not result in a large accumulation of surplus funds, which might require a significant change in the RTO West pricing structure.

1.3.2. Ancillary Services/IOS

Congestion management and the provision of ancillary services are highly correlated energy markets. It is therefore expected that the pricing of the AS/IOS markets will be compatible with bidding for and pricing of services to manage congestion on the RTO West system.

2. Congestion Model

2.1. What Are FTOs?

An FTO gives the holder the option (subject to certain conditions) to receive a credit from RTO West equal to or less than the value of the option, which is calculated by multiplying the congestion price at the point(s) of injection minus the congestion price at the point(s) of withdrawal by the quantity of power in megawatts described in the FTO for one hour. An FTO is described by a quantity of power between a set of injection and withdrawal points.

Injection and withdrawal points are (typically) busses in the RTOW West transmission system.

[*NOTE: We need to consider whether injection and withdrawal points could be more broadly defined than as single busses, such as by nodes. We might define a node to be a set of busses that it is useful to treat as a single group for congestion pricing, scheduling, operations, or in defining classes of facilities.*]

2.1.1. FTOs Are Settled as Credits Against Congestion Caused by Schedules

The Scheduling Coordinator who redeems an FTO on behalf of the holder receives a credit equal to the value of the option, regardless of whether the holder schedules power between the specific injection and withdrawal points described in the FTO.

The credit paid on an FTO for a particular hour cannot exceed the amount of congestion costs associated with the holder's schedules that were honored on that particular hour. The option to receive the credit expires at the end of the hour to which the FTO is tied.

An FTO may be traded until (but not after) the schedules that will determine the FTO's value are submitted. RTO West will implement a system to track ownership of FTOs.

Sets of FTOs may be subdivided into units as small as a single MW for one hour, and may be traded on the secondary market.

2.2. Managing CTR Service.

RTO West will have the duty to provide transmission service on behalf of the PTO for pre-existing contracts and Load Service Obligations that are not converted to RTO service. When the transmission rights associated with these obligations are used, RTO West will take into account the net effect of all these uses in estimating the capacity available on the system for other uses. This pooling of rights will be across the entire RTO network in order to maximize utilization of the transmission system.

As explained in more detail below, existing PTO transmission service obligations (existing contracts or load service obligations) that are not converted to FTOs will be catalogued and

expressed as "Catalogued Transmission Rights" or "CTR." RTO West will manage CTR service for all PTOs on an aggregate or pooled basis.

An existing contract means (1) a contract in effect on [date] that provides for service to load within the RTO West service area; (2) a contract in effect on [date] to import or export power to or form the RTO West service area, or (3) any other contract for transmission service (other than non-firm service) on RTO facilities in effect on [date]. A load service obligation (LSO) is one that is not currently described by a contract, but nonetheless is an obligation of a PTO.

3. Cataloguing Existing Contracts and LSOs

3.1. Introduction

The cataloguing of existing rights and LSOs will define for RTO West the extent and nature of the obligations that RTO West will need to meet, on demand, for each PTO (or the rights-holder's SC, in the event the rights-holder chooses to take service directly from RTO West). It will also identify the associated congestion management assets that the PTO will make available to RTO West to make good on the PTO's obligations. Because PTO obligations are expressed in many different contracts with many different provisions, the catalogue will be useful in giving RTO West a standardized benchmark against which RTO West will be able to check if a schedule is within its pre-existing transmission rights. The catalogue of a PTO's obligations and assets will also give RTO West information to use in testing the sufficiency of the PTO's assets to meet the PTO's obligations (test for overselling) and if necessary to work out with the PTO what additional assets are needed by RTO West to make good on the PTO's obligations.

3.2. Expanded Definition of CTRs

A CTR entitles the rights holder's Scheduling Coordinator to receive a credit from RTO West equal in value to the whole of the congestion charge that may be incurred when a schedule is submitted on its behalf that is consistent with the catalogued rights and underlying contract conditions.

Transactions by the rights holder that do not conform to its catalogued rights receive no credit against congestion costs. Catalogued rights that are not scheduled do not receive any credit.

3.3. PTO Obligations to Support CTR Service Pool

To enable RTO West to take on the responsibility of managing the CTR service, the PTO will be required[1] to provide RTO West with a detailed catalogue of the obligations that it expects

[1] Dispute resolution may be required to the extent that the PTO and the affected rights-holder cannot agree.

RTO West to meet and the resources that it will provide RTO West to meet such obligations. These resources will include physical transmission facilities (such as wires and poles, phase shifters, and other equipment that affects the ability to transmit power) plus contract rights to use capacity on other PTOs' facilities, as well as operational or contractual mechanisms such as RAS and re-dispatch services or other agreed-upon PTO commitments. For purposes of this paper, these collective means of satisfying obligations are referred to as PTO congestion management "assets."

So long as the assets are sufficient to meet the obligations, RTO West should be able to fulfill all the PTO's obligations without cost-shifts to other network users or PTOs. Over time conditions will change, resulting in the possibility that the PTO's obligations or assets might change. Therefore updates to a PTO's obligations and assets are necessary for RTO West to assure itself that sufficient assets continue to be made available to meet the revised obligations without shifting costs to other customers.

If PTO's congestion management resources to support the CTR service included the provision of re-dispatch service, then the PTO will be required to continue to cover the re-dispatch or residual congestion costs associated with that CTR, subject to the conditions that necessitate re-dispatch being met as catalogued.

A procedure to verify the sufficiency of the PTO's congestion management assets and to determine the PTO's share (if any) of congestion management costs incurred by RTO West in meeting the PTO's CTR obligations is described in section.

3.4. Rules for Use of CTRs and Assignment of Rights to Others

If a PTO and a rights-holder agree on catalogued rights, the rights-holder may elect not to schedule service under its pre-existing contract through the PTO, but instead to schedule directly with RTO West (through a Scheduling Coordinator (SC)) under the terms of the CTR.

The PTO or the rights-holder's SC will submit a schedule to RTO West and identify the catalogue number that supports the schedule. RTO West will verify that the schedule fits within the parameters as listed in the catalogue. As long as the schedule fits within these parameters, the PTO or the SC on behalf of the rights-holder will receive a credit equal to any congestion charges associated with the schedule. An exception would be if the underlying contract made the contract holder subject to congestion charges that might be identified by curtailment procedures, re-dispatch costs, etc.

If all or part of the schedule does not meet the parameters identified in the catalogue, then the PTO or the rights-holder's SC will be subject to congestion costs associated with that portion of the schedule not covered.

CTRs can be reassigned to the extent that the underlying contract or obligation allows reassignment or a legal requirement mandates reassignment. Typically, reassignment means the permanent assignment of the rights to a third party, whereas, trading can be a temporary rent of a right by a third party.

3.5. Catalogue of Obligations and Assets

3.5.1. Rules for Cataloguing Obligations and Assets

3.5.1.1. Rights Holder Opportunity to Participate

The PTO shall undertake a process jointly with the rights-holder to determine the CTRs for any rights-holder wishing to take service directly[2] from RTO West.

3.5.1.2. Update to Obligations and Assets

Updates to a PTO's obligations and assets will be necessary whenever there is a substantial change in the underlying conditions (that would have been accounted for in the underlying contract) in the current catalogue. Updates will, at a minimum, need to occur once per year. The update of the PTO's catalogue needs to be co-ordinated to fit with the timing of FTO auctions.

3.5.1.2.1. Changes in Obligations

Obligations may include service that is tied to a variable such as loads or obligations may be altered over time. Any of these situations may cause an update to occur.

3.5.1.2.2. Load growth[3]

If a PTO's catalogue includes service to firm load and the service also has provisions for load-growth, RTO West will need annual updates of load forecasts. Such load forecast should be by month for both on-peak as well as off-peak demand. The PTO (or jointly with affected rights-holder wishing to take service directly from RTO West that so choose) will modify its obligations to reflect the increase (or decrease) in load service. Given that the PTO must submit to RTO West a balanced set of obligation and assets, the amount of load growth will naturally be limited to capacity on the PTO's transmission system (unless the PTO takes some other action such as redispatch to make good on the obligation that exceeds capacity).

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[2] Taking service from RTO West does not imply that the CTR has been converted to FTOs but does imply that the rights-holder has or will establish a direct on-going operational relationship with RTO West.

[3] The changes in load growth may need to be linked into Pricing.

3.5.1.2.3. To reflect changes in contract provisions, Tariffs, Business Practices, and Scheduling Provisions.

If a PTO's catalogue of obligations would be affected by a change in contract provisions[4], or if a change in the PTO's Tariffs, Business Practices, or Scheduling Provisions would affect the catalogue then the PTO (and affected rights-holder wishing to take service directly from RTO West that so choose) will need to update its catalogue. A change in a pre-existing contract provision (sufficient to require an update to the catalogue) may include: 1) changes agreed to by the contract right holder and the PTO (e.g. change to a POD), 2) changes based on contract rights exercised by the contract right holder (e.g. rollover rights), and 3) changes required by an arbitrator, court, or regulatory body having jurisdiction over the PTO.

3.5.1.2.4. Changes in Assets

RTO West and the PTO may need to update the catalogue if there are changes to the PTO's assets after initial cataloguing.

3.5.2. Cataloguing Obligations

The catalogue of obligations should define for RTO West in standardized terms the bounds or range of transmission rights the PTO has committed to provide.

3.5.2.1. Term

The term defines the start and end date during which the obligation is to be honored.

3.5.2.2. Injections

The catalogue will include specified injections, which will be defined in terms of nodal[5] locations and maximum amounts to be honored (at each node). The sum of the maximum amounts at the injection nodes may be unequal to the sum of the maximum amounts at the withdrawal nodes.

3.5.2.3. Withdrawals

The catalogue will include specified withdrawals, which will be defined in terms of nodal locations and maximum amounts to be honored (at each node).

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[4] Including, but not limited to a rights-holder's decision to participate in RTO West.

[5] The nodes that RTO West uses in cataloging CTRs may be defined as busses (granularity) or may be some aggregation of busses. This needs to the resolved.

3.5.2.4. Special Rules

The catalogue may also include special rules, which will define exceptions to the standard rules (e.g. exceptions to the rules governing deadbands (as explained below under Section _)). To the extent that there are special limitations or exceptions that cannot be captured by the set of injections and withdrawals, special rules would be included to govern the use of the catalogue. This may be in the form of interdependency between nodes (e.g. injection limit at node A is 100 MWs and injection limit at node B is 75 MWs, however the sum of injections at A and B must not exceed 125 MWs).

3.5.2.4.1. Type of Obligation

The catalogue will classify the type of obligation in the underlying contract or LSO, and will attempt to classify this into standard categories, which apply to the different types of obligations. Some illustrative (but not exhaustive) examples of categories are described below

3.5.2.4.1.1. Load-based Obligation

The load-based obligation category covers obligations that are tied to following firm load (LSO and NT contracts are examples). The location of the load defines the set of withdrawals with maximums based on the actual load served. Because the load is not known ahead of time, the catalogue will use an estimate of the maximum based on a load forecast. RTO West will be given a revised maximum at pre-schedule. The set of injections will be based on the physical and contract resources used to serve such load. While the maximum injection at each node is equal to the physical capacity of the system, the sum of the injections should not exceed the corresponding contract obligation at the time of injection. For physical facilities or for contract resources the generation limit that is specified in such contract shall govern.

Some load-based obligations (e.g. General Transfer Agreement or GTA service) represent network and point-to-point service across more than one PTO system. The transferring PTOs will catalogue[6] the rights from the Points of Replacement to the Points of Delivery much as the other load-based obligations above. Restrictions and Ancillary Services would be addressed in the Special Rules section.

3.5.2.4.1.2. Demand based

The demand-based obligation category covers obligations that are tied to a contract that specifies demand limits. For most contracts the demand is fixed and the procedure is fairly straightforward. The points of delivery define the set of withdrawals with maximums based on

[6] For example a GTA between PTOs would show up in the catalog of both PTOs. The PTO receiving GTA service would show it as a contractual asset and the PTO providing GTA service would show the contractual obligation.

the demand specified in the contract. The set of injections will be based on the points of receipt or points of integration with maximums based on the demand specified in the contract. Some demand-based contracts act like ownership-based contracts and would need to be catalogued in a similar fashion (see the description under Ownership for the appropriate catalogue rules). An example of such a contract would be a contract that gives a right to transmit between points A and B in both directions so long as the net usage is within the demand limit for that direction. In that case the catalogue rules for a bi-directional, simultaneous "ownership-based" contract would be appropriate.

3.5.2.4.1.3. Ownership

The ownership obligation category covers obligations that are tied to ownership (either direct or by lease) of a transmission facility. The point of injection and point of withdrawal are defined as either end of the transmission line segment (for examples assume the bounding nodes are A and B and the line rating is 100 MWs from A to B and 75 MWs from B to A). Ownership rights may take the form of bi-directional and simultaneous use, bi-directional and non-simultaneous use, or uni-directional use (the rules for which are described below). Because each form has slightly different implications they will need to be treated differently.

3.5.2.4.1.3.1. Bi-directional and simultaneous use

The bi-directional and simultaneous use category is for contracts under which the rights holder has the ability to use the path in either direction and at the same time. The net of the two schedules must be within the line rating for the net flow. For example assume schedule 1 is 200 MWs injected at A and withdrawn at B, schedule 2 is 125 MWs injected at B and withdrawn at A. This nets to 75 MWs injected at A and withdrawn at B. Note that each schedule individually exceeds the path rating but that the net use is within the rating. This implies that the two schedules must be linked and that if one schedule is altered then the other schedule must be adjusted so that the net use is within the applicable path rating. The catalogue for this type of obligation would show both points as injections and both points as withdrawals. The maximums would be governed by special rules that would represent the interdependency (injection (A) - withdrawal (A) must be between +100 and –75 and injection (B) – withdrawal (B) is between +75 and –100).

3.5.2.4.1.3.2. Bi-directional and non-simultaneous use

The bi-directional and non-simultaneous use category is for contracts under which the rights holder has the ability to use the path in either direction but not at the same time (up to 100 MWs from A to B OR up to 75 MW from B to A). The catalogue for this type of obligation would show both points as injections and both points as withdrawals with the associated directional

line limits as the maximum (in this example Injection set = [100 @ A, 75 @ B] and Withdrawal set = [75 @ A, 100 @ B]).

3.5.2.4.1.3.3. Uni-directional use

The uni-directional use category is for contracts under which the rights holder has the ability to use the path in only one pre-defined direction (up to 100 MWs from A to B). The catalogue for this type of obligation would be similar to a uni-directional demand based contract (e.g. PTP) in that there is a single point of injection and a single point of withdrawal specified with the associated directional line limit as the maximum (in this example Injection set = [100 @ A] and Withdrawal set = [100 @ B]).

3.5.2.4.1.4. Regional Coordination Agreements (PNCA and MCHC)

The regional coordination agreement category is for obligations that are tied to multi-party resource operating agreements. Since these agreements are resource based (rather than load-based) transfer of power can be viewed to be between resources. Since service to load is not guaranteed through these agreements the rights holder would be responsible to get power from their resource to their load via a separate transmission agreement. This means that both the points of injections and points of withdrawals are defined at the resources identified (and coordinated) in the agreements. Since each agreement has slightly different implications they will need to be treated differently.

3.5.2.4.1.4.1. Pacific Northwest Coordination Agreement

The catalogue should capture the range of possibilities of PNCA transactions (In Lieu Energy, Provisional Energy Return, Interchange Energy, etc.). The points of injections and points of withdrawals would be each of the Coordinated System resources (as submitted annually in PNCA planning). This sets up a resource-to-resource exchange where each party's normal load serving transmission agreements would be used to take the energy from its resource to its load). The maximum amounts of injections and withdrawals would be based on the most recently completed annual operating plan and the interchange estimates derived from the range of maximum and minimum Interchange Energy amounts out of the annual PNCA Headwater Benefits study. The catalogue for PNCA transactions should be updated annually after the PNCA Final Regulation is complete (to capture resource additions and operating plan changes).

3.5.2.4.1.4.2. Mid Columbia Hourly Coordination Agreement

Given the real-time nature of MCHC operations and the close proximity of the resources included in MCHC, the MCHC projects should be grouped into a single node for cataloguing purposes. The range of possible uses of MCHC on a "bus-to-bus" basis are so large that

utilization of multiple nodes would necessitate a significantly large dead-band. [Add note here about perhaps handling as a matter of regulation or dynamic scheduling, rather than schedule adjustments]

3.5.3. *Cataloguing Assets*[7]

The PTO shall submit to RTO West a catalogue of assets that it will make available to RTO West to satisfy the catalogued obligations. As noted above, these assets can include a range of physical and other facilities, which are listed below.

3.5.3.1. Physical Facilities

The catalogue will include a list of facilities and hardware including transmission facilities, phase shifters, etc.

3.5.3.1.1. Special rule for expansion.

A PTO that has expanded its transmission capacity to meet its catalogued obligations shall reflect such increased capacity in its catalogue of assets. In the event that the PTO has not committed the use of all its expanded capacity the PTO shall submit for RTO West's approval its request to convert the unused capacity to FTOs (defined with points of injection and withdrawal on either end of the expansion). After RTO West tests the conversion for adequacy, the PTO can include in its catalogue of obligation the FTOs approved by RTO West. These FTOs are treated like any other FTOs.

3.5.3.2. Operational & Contractual Mechanisms

The catalogue will include a list of operational or contractual mechanisms made available to RTO West to assure that the catalogued obligations can be honored under a range of contingencies (e.g. line outage, nomogram restrictions, extreme coincidental use). Operational or contractual mechanisms may include RAS and curtailment rights under pre-existing contracts.

3.5.3.3. Determination of Asset Sufficiency

The following steps need to be completed whenever the catalogue of PTO's obligations and congestion management assets needs to be established or updated. The test of sufficiency shall also be performed periodically at a time coordinated with the RTO's release of FTOs into the market.

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[7] It is recognized that to the extent that a PTO has included load growth in its catalog of obligations that it may choose to serve it from existing facilities or from new facilities resulting from system expansion.

3.5.3.3.1. PTO Inventory

The PTO shall identify all its obligations to provide transmission service that it requires RTO West to fulfill by providing the details specified above in ***Catalogue Obligations***. The PTO shall also identify the assets it shall make available to RTO West to fulfill such obligations by providing the details specified above in ***Catalogue Assets***.

3.5.3.3.2. Assessment of Asset Sufficiency

Objective: (i) to verify that the PTO's catalogue of CTR obligations are adequately underwritten by the PTO's congestion management assets;

(ii) to determine what (if any) is the extent of a PTO's liability for a share of residual congestion attributed to the expected usage of the CTRs obligations in the PTO's catalogue.

RTO West will periodically [say 3 months before each 6-month auction date] request each PTO to provide it with a confidential (but non-binding) forecast of the load served by its catalogue CTRs, profiled into on/off-peak hours in each month, including any growth factor, and a forecast of the resources (owned or contracted) it would use to serve this load over the next operational planning period [say the next 6 months].

RTOW will use this data (a) to verify each PTO's CTR inventory, and (b to estimate the expected amount, distribution and incidence of system capacity it should reserve to support each PTO's CTRs, and (c) in conjunction with other PTOs' data, to estimate the share of congestion attributed to the PTO's obligations. To do so, RTO West may use production simulation software (proprietary or its own) to simulate the expected flows in the network from the available resources to the loads according to the terms and conditions of all PTOs' Obligations catalogues, and over the operational planning period [4380 hours or a representative sample thereof].

If any congestion is identified in this test (after applying any RAS or other appropriate operational/contractual mechanisms), RTO West will estimate the volume (in MWh), location and incidence that is attributable to each PTO's CTR obligations. If necessary and appropriate, RTO West can repeat the calculation taking into account a reasonable variation ion the range of the PTO's resources committed.

It will then estimate the share that the exercise of each PTO's CTR obligations contributes to this total, and will translate this into each PTO's %age share of liability for residual congestion that is attributed to the exercise of their CTRs in future schedules. Using forward inc/dec prices or its own forecast of congestion re-dispatch costs, RTOW (together with the PTOs) will then estimate the total expected cost of this residual congestion and agree this as a basis for setting the congestion management target that RTOW will work to over the next operational planning period.

3.5.4. Dispute Resolution.

With respect to the cataloguing of PTO assets and obligations, and to the assessment of asset sufficiency and the PTO's share of future residual congestion costs, this paper assumes that in the event that all parties cannot agree to the outcome, this process would conclude with ADR as agreed to under the TOA.

3.5.5. Cataloguing Errors

Any errors in cataloguing will be corrected promptly upon discovery by reference to the underlying contract that governs the right.

RTO West will correct any billing error resulting from a cataloguing error that is discovered before the bills become final. Any billing disputes that arise as a result of a catalogue error may be taken to dispute resolution.

[Note: Need to decide when bills become final and non-appealable. This and related issues were worked on by the Billing and Settlements Group.]

3.6. Transmission required for AS/IOS & Losses

3.6.1. Self tracking of AS/IOS

3.7. Contingency and Curtailment

Deferred until later

4. Creation of Tradable Rights

4.1. Conversion

The conversion of a CTR to an FTO provides a mechanism for rights-holders to convert their existing transmission rights to a tradable right. This right is open only to CTR holders that are willing to establish a relationship with RTO West through a Scheduling Coordinator. The conversion is subject to RTO West's approval and must meet two principles. The conversion must not exceed the underlying rights and the associated PTO (and other PTOs for that matter) is not adversely impacted by the conversion.

4.1.1. Procedures for Conversion

A contract rights-holder wishing to convert its CTR to a FTO will need to complete the following steps before conversion. (Note: the following procedures assume that the rights-holder would be a transmission customer and that the customer would need to have an

appropriately defined business relationship with RTO West at the time of conversion. A fundamental premise is that conversions are done for a specified term. Upon expiration of the FTO conversion term, the rights revert back to the original CTRs, if still in effect.)

4.1.1.1. Single Feasible Dispatch

To convert a CTR to an FTO, the rights-holder must select a single feasible dispatch for each month[8] (for both on-peak and off-peak) that is within its transmission rights over the six-month period covered by the conversion. The rights-holder may specify full conversion of a CTR for the six-month block or may specify a partial conversion.

Partial conversion may be temporal (selecting specific months within the six month block to do a full conversion) or may be in terms of a percentage of rights (or both). In the percentage of rights model, the rights-holder will specify what portion of its CTR will be converted to an FTO with the remaining CTR adjusted so that the sum of the FTO and the adjusted CTR does not expand the rights under the original CTR. The way the rights-holder defines its CTR will affect the amount of increase in liquidity and potentially the amount of incentive. (It may be necessary for RTO West to limit the rules for partial conversions to the extent needed to keep them workable.

4.1.1.2. Submit Conversion Request to PTO for Approval

The rights-holder must take steps to assure that the balance of obligations and assets reflected in the PTO's catalogue is not adversely affected. It may do that by either making arrangements with RTO West that will in essence keep the PTO neutral or in the alternative submit its proposed FTO and adjusted CTR (if a full conversion is done the adjusted CTR would be a null set) to the PTO holding the CTR. If arrangements with RTO West have not been made, the rights-holder must get the PTO's agreement that the new set of FTOs and CTRs are within the original CTR and if curtailment rights on the CTR were included in the PTO's catalogue of assets, its approval on how the rights-holder would honor its obligations for curtailment.[9] The PTO's authority to deny the request is limited to that scope.

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[8] An open issue is the granularity of the sale period? Can FTOs be sold in weekly blocks? Daily blocks?

[9] When the rights-holder converts a contract that has curtailment rights for the PTO it must either pass along such provisions to the purchaser of the FTO or stand ready to satisfy the curtailment risk in some fashion that is acceptable to the PTO. Since FTOs and an accept all schedules model creates a product that is in essence firmer than the curtailable CTR, someone must take on the obligation for curtailment if the PTO exercises such an option.

4.1.1.3. Submit Conversion Request to RTO West for Approval

The rights-holder must submit the agreed upon FTO and adjusted CTR package to RTO West for approval. RTO West shall verify that such conversion is feasible and if liquidity is needed, what the potential benefit to liquidity is for the conversion (to be used as the basis of any potential incentive compensation).

4.1.1.4. Record Adjusted CTRs and FTOs

RTO West and the PTO must adjust the PTO's catalogue of obligation and assets to reflect the conversion.

4.1.2. Conversion Rules[10]

For most CTRs the conversion rules will be the same since the act of cataloguing obligations standardizes the transmission rights to a great extent. The standard rules are described in the Procedures for Conversion section above.

4.1.2.1. For load serving obligations or contracts.

Significant further work is needed on rules for converting network contracts and other "load-serving" contracts. If it can be made feasible from administrative, operational, and economic standpoints, it may be possible to develop procedures that allow rights holders to relinquish flexibility and sell forward the capacity that is freed up as a result. If feasible, the rights holder would be able to decide how much of the contract and for how long it will implement the "partial" conversion. *[the idea about possible "partial" network contract conversion would require a robust verification mechanism. It will work only if we figure out how to address the revenue adequacy problem and design conversion rules that prevent gaming and avoid the danger of unintended consequences (such as throwing off the expectations about actual dispatch of schedules under network contracts on which RTO West relied to predict future available capacity).]*

4.1.2.1.1. Load Serving Obligations (LSO)

Conversion rules for LSOs will be significantly influenced by the Retail Access policies of the appropriate regulators. In general, the rights-holder and the PTO will determine the rights-holder's catalogued rights, then the rights-holder will select a single feasible dispatch from those rights under which it will receive FTOs and go through the approval process described above.

[10] We need to think through interaction with pricing model and how to create long-term multi-year rights.

4.1.2.1.2. NT

The rights-holder may fully or partially convert its NT contract using the standard rules. The rights-holder can either aggregate its load busses and generator busses into hubs that meet the definition of market hubs and be issued FTOs between these hubs that are consistent with the underlying contract or it can select a single feasible dispatch between discrete busses that is supported by those rights. The conversion will go through the approval process described above under the section concerning conversion of load service obligations.

4.1.2.1.3. GTA

The transmission rights associated with delivery on the Transfer Provider's system are linked to the conversion status of transmission on the GTA holder's system (Full or partial conversion of GTA transmission would require equivalent conversion of the rights used to wheel across the originating PTO). When a rights-holder whose PTO holds a GTA on its behalf converts its service to FTOs, the PTO holding the GTA will do a partial conversion of the GTA on behalf of the rights-holder.

4.1.2.2. For Demand-Based Contracts

The rights-holder may fully or partially convert its demand-based contract using the standard rules. In the event that a demand-based contract has properties similar to a bi-directional, simultaneous "ownership-based" contract, the translation rules for a bi-directional, simultaneous "ownership-based" contract would apply.

4.1.2.2.1. Single POD/POR

There is no optionality to lock-down so the FTO looks exactly like the CTR (for a full conversion).

4.1.2.2.2. Multiple POD/POR

The rights-holder may fully or partially convert its demand-based contract using the standard rules.

4.1.2.3. For Ownership Arrangements

The rights-holder may fully or partially convert its ownership/leased-based contract using the standard rules with limited exceptions (see below).

4.1.2.3.1. Bi-Directional and Simultaneous Use

The rights-holder may fully or partially convert its contract using the standard rules except that the CTR should be first translated into two separate CTR with the path rating for each direction establishing the maximum injection and withdrawal amounts (in the earlier example one CTR

would be 100 MWs injection at A and withdrawal at B, and the other would be a 75 MW injection at B and withdrawal at A). The full or partial conversion would then be applied to either or both CTRs. The conversion must recognize the interdependence of simultaneous use so that it does not create more FTOs than the rights underlying the contract. Intent - "equivalent economic position" – must not undermine RTO West's revenue adequacy position.

4.1.2.3.2. Bi-Directional and Non-Simultaneous Use

The rights-holder may fully or partially convert its contract using the standard rules.

4.1.2.3.3. Uni-Directional Use

The rights-holder may fully or partially convert its contract using the standard rules.

4.1.2.4. Regional Coordination Agreements (PNCA and MCHC)

Given the complexity of these agreements and the potential that there may be no charge for transmission used by these agreements, conversion of these agreements to financial transmission options is not allowed.

4.2. Incentives to Improve Liquidity

Although tradability in of itself is an incentive for some rights-holders to convert CTRs to FTOs, RTO West may at times want to provide additional incentives for actions that increase liquidity if it judges there is insufficient liquidity. If additional liquidity is required RTO West may want to provide incentives for holders of CTRs to convert to FTOs or take some other action that would increase liquidity.

4.2.1. Guiding Principles

4.2.1.1. Incentives Should Be Commensurate to the Increase in Liquidity.

Partial conversions that add little to liquidity should get less incentive than total conversions that locks down optionality. Furthermore, locking down optionality (without necessarily converting to an FTO) on a highly flexible contract may provide greater liquidity than converting a contract with limited flexibility.

4.2.1.2. Costs of Liquidity Incentives.

Costs of Incentives should be born by those that benefit from liquidity. Funding to pay for incentives will come from designated portions of auction revenues that result from sales of FTOs made available by the incentives.

4.2.2. Actions eligible for incentives

4.2.2.1. Conversion of CTRs to FTOs

Conversion of CTRs to FTOs may be eligible for incentives. The size of the incentive will be determined by RTO West in its determination of liquidity benefits.

4.2.2.2. Non-conversion commitments that increase liquidity

Any commitment taken by a rights-holder that has the effect of assuring RTO West that it can release additional FTOs for auction (e.g. locking down optionality) may be eligible for incentives.

5. FTO Auctions

This section provides an overview of the FTO auction process (Section 5.1); the Auction timeline and specification of the product auctioned (section 5.2); a description of the Adequacy test that informs RTO West how many FTOs to release (Section 5.3); a description of the rules that govern secondary trading of FTOs (Section 5.4); a definition of liquidity and the appropriate RTO actions to enhance liquidity should they be required (Section 5.5).

5.1. **FTO Auction Overview**

The FTO auction facilitates the primary release of FTOs into the transmission rights market (the secondary market). The quantity and location of FTOs released is based RTO West's estimate of the 'auctionable capacity' that remains on RTO West's Transmission System after allowing for all CTRs and all existing FTOs in the market.

This auctionable capacity arises from the following categories or actions: (1) existing uncommitted transmission capacity (2) capacity released by the expected netting of pooled CTRs when these are exercised; (3) new projects, and (4) RTO West expectation of the volume, location and value of forward inc/dec bids.

The objective in designing the FTO auction process is to enable RTO West (1) to allow access to transactions that wish to use the transmission system and (2) to allocate scarce transmission capacity (during those e times when it is limited) to those who value it most. The process described below should allow RTO West to accomplish these two goals without imposing unreasonable levels of risk or congestion cost on existing or new users of the system. With this qualification, RTO West should aim to maximize the utilization of the transmission system capability and to maximize the revenue from the primary release of FTOs.

Initially, RTO West will begin with the auction of longer-term strips of FTOs (e.g. a six-month strip six months ahead of real time), and subsequently release shorter strips in shorter-term [monthly] auctions closer to real time. As RTO West gains experience with the auction

process, it may make appropriate changes adjustments to its release policy in order to achieve its aims while remaining within its congestion management budget.

As described in Section 5.3, RTO West will develop and apply a Revenue Adequacy test to ensure that it can fulfill all of its existing financial obligations to CTR and FTO holders in addition to those of any new holders. In short, it will manage congestion to deliver a targeted cost for residual congestion.

RTO West will have the ability to impose a percentage charge (like a sales tax) on FTO buyers and sellers for the FTOs auctioned to assure that it has sufficient revenues to cover its costs of meeting any new obligations.

To the extent that RTO West needs to take actions (like take on more risks) to add liquidity it will do so in a way that assures each PTO that its balance sheet of cataloged obligations and assets will not be adversely impacted over some reasonably long period. Any costs directly attributable to those who want RTO West to take additional risk will be borne by those participants. RTO West will not adjust auction prices or congestion prices after the close of the auction or the close of real time operation period. The Revenue Adequacy test should be conducted on a sufficiently long enough period to allow RTO West to use its tools to adjust future prices and quantities of FTOs to meet its budgetary targets.

5.2. Auction Time Line

- RTO West will hold FTO auctions on a six-monthly and a monthly basis.
- Before the start of an FTO auction, RTO West opens the auction quoting period and Market Participants may submit bids to purchase and offers to sell FTOs.
- **[time period]** before the start of the auction period, the auction closes. ??
- RTO West performs the FTO auction clearing analysis (described below).
- RTO West will post the results of the auction within **[time period].**

FTOs acquired in an FTO auction have the following standard characteristics:

- FTOs can be sold as ‘strips’ from anything as short as an ‘On Peak’ and/or ‘Off Peak’ period in a single day to as long as all 4380 hours for 6 months.

- FTOs give the holder the right to a credit against, but not exceeding, his transmission congestion charges and are valid through the expiration date of the FTO [the end of day-ahead or real time].
- An FTO is described by an amount of power defined between a set of injection and withdrawal points, which can be related to a physical quantity of power flowing between actual points on the RTO West transmission system.
- FTOs are available between any single bus and/or hub, or combination of buses and/or hubs for which a locational price is calculated and posted (subject to simultaneous feasibility).
- The FTO fully hedges its holder against congestion payments to RTO West when the holder's energy delivery exactly matches the FTO's definition
- FTOs can be used as hedge only in conjunction with a valid schedule submitted by an SC. The schedule need not be between the injection/withdrawal points of the FTO
- Auctioned FTOs are treated in the same manner as FTOs acquired through the conversion of pre-existing contract services.

5.3. Auction Revenue Adequacy Test: How many, how much and where?

Objective: (i) to estimate the number, location and volume of FTOs that can be released into the market without unduly increasing in cost of residual congestion; and

(ii) to compute the share of liability for residual congestion cost that should be attributed to these FTOs.

Based on the results and data of the reference case(s) of the Asset Sufficiency assessment (see section 3.5.3.3.2), RTOW can estimate the amount and distribution of circuit ATC on all (significant) paths after allowing for expected CTR flows and modeling all existing FTOs as point-to-point injections of their nominal quantity between the specified end-points. Assuming there is some ATC, it can estimate how many FTOs, and between where, it can offer into the auction without exceeding its allowed congestion budgetary management target. It does this by superposing the new FTOs as injections/withdrawals into the reference analysis and estimating the resultant increase in the volume and cost of residual congestion, and the %age share of this attributable to each FTO. Note that in doing so, RTOW is maximizing network utilization (subject to a cap on residual congestion cost): not maximizing the FTOs released between any pair of end-points. However, its objective can be set to any combination of both – depending on its market intelligence.

By this means, RTOW will be able to manage the volume and expected cost of residual congestion, and allocate a share of liability for this to PTOs (for existing CTRs) and

purchasers of FTOs (old and new), in a way that ensures it can operate [reasonably] within its congestion target, regulate the number and distribution of FTOs in circulation, and manage its exposure to FTO rebate costs.

All of which implies that none of the revenue from FTO auctions needs to be 'ear-marked' for any future congestion management costs (these are borne by the buyer). Depending on decisions made elsewhere, the net auction revenue can be allocated to the PTOs as owners of unencumbered ATC, to investors in new transmission capacity; to the short-term revenue deficit, or to reduce the net cost of uplift.

RTO West's net revenue from the FTOs auction is the sum of:

- A surplus/deficit from the creation and sale of additional FTOs that have higher or lower value than the actual residual congestion costs attributed to them.
- A surplus/deficit from the auction settlement. RTO West increases its chances of a surplus if it uses a pay-as-bid system for paying the FTO sellers and imposes a small surcharge on the FTOs auctioned.

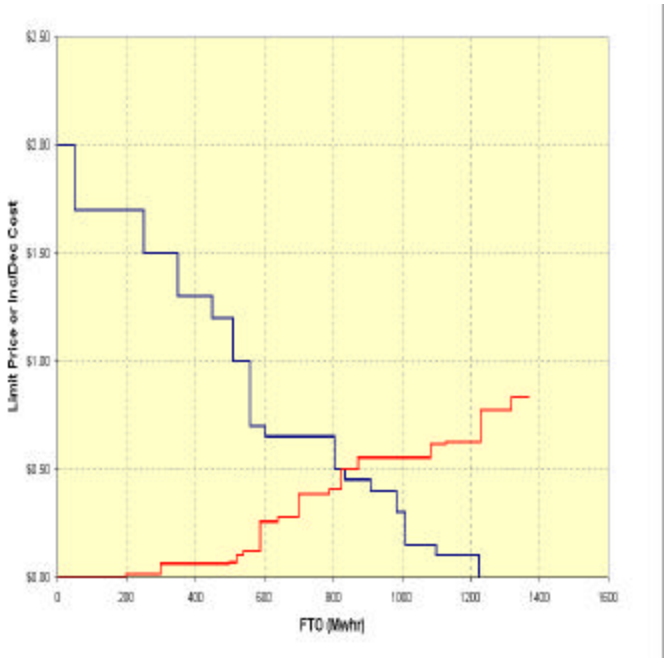
5.4. Auction Design

There are many ways to design the auction so as to achieve RTO West's twin objectives. One such is briefly described.

- Solicitation of FTO buy bids. On day (-X), RTO West invites potential FTO buyers to submit binding buy bids for specific FTOs designated as between various sets of end-points. Invitation ends on day (-XX). A buy bid can be a limit price bid or a market price bid.
- Demand aggregation. At the end of each round during the solicitation period, RTO West aggregates the FTO demand bids to form the aggregate demand curve for FTOs. The aggregation process takes account of the interaction of transactions on the system.
- The auction bids are ordered by descending price to form a FTO demand curve. An FTO buyer can submit a market price bid and these form the vertical segment of the FTO demand curve.
- Posting of the aggregate demand curves. If there are multiple rounds, RTO West posts the aggregate demand curves at the end of each round during the solicitation period.
- Buy bid adjustment. During the invitation period, a FTO buyer can revise its buy bid if the adjustment increases the bid price for the same quantity.

The FTO Supply/Demand Curve

This allows RTOW to construct a supply/demand curve for FTOs, as shown below, which identifies the potential number of FTOs that RTO West could sell at the prices bid, ranked against its expectation of residual cost of congestion the FTOs would add. The intersection also identifies the price that bidders pay for the FTOs.



- Determination of winning bids. After the solicitation period on day (-XX), RTO West determines the winning bid pairs by setting a price P such that (a) a winning sell bid has a bid price at or below P; (b) a winning buy bid has a bid price at or above P; and (c) the number of FTO under (a) = the number of FTO under (b). Because of (c), RTO West should be able to use the capacity supplied by the FTO sellers to almost surely meet the demand for transmission by the FTO buyers.
- Announcement of auction results. On day (-XX+1), RTO West announces the auction results by posting the price P and the number of FTOs auctioned. RTO West also notifies the winning bidders.
- Auction settlement. All winning FTO buyers pay P. RTO West may impose a small markup on the price paid by the FTO buyers. Auction settlement occurs after the winning bids have been accepted and verified.

5.5. Auction Business Rules

The following summarizes RTO West's FTO auction rules:

- A Market Participant must be an Eligible Customer or an RTO Transmission Customer to be eligible to submit bids or offers into the FTO auction.
- Market Participants cannot submit offers to sell FTOs that they do not own
- Invalid quotes into the auction are rejected. These quotes may be resubmitted and if time-stamped as received by RTO West before the close of the auction quoting period are included in the auction.
- All FTOs that were converted from CTRs (during the auction quoting period) and have a status of approved and confirmed by the customer at the close of the auction quoting period are modeled as injections in the auction analysis and not offered for sale in the auction.
- Any FTO request that is approved by RTO West, but not confirmed by the customer by the close of the FTO auction quoting period, is deemed to be withdrawn.

5.6. FTO Secondary Market

5.6.1. FTO Secondary Markets Overview

FTOs may be traded on the secondary market. The secondary market is a bilateral system that facilitates the trading of existing FTOs between Eligible Customers.

RTO West must keep track of the transfer of ownership of FTOs in order to validate the claimed credit when the FTO referenced by a SC when submitting a schedule.

The following is a list of business rules and guidelines for secondary trades:

- The FTO secondary market allows trading of existing FTOs.
- The end-points of FTOs cannot be reconfigured in the secondary market, but the quantity and duration of the FTO can be sub-divided down to a minimum level of [1MW] for 1 hour.
- Anyone can buy and sell FTOs in the secondary market, but only eligible customers can receive congestion credits from RTO West.

5.6.2. *What is a Market Hub?*

A market hub is a convenient location to exchange energy and/or other derivative products. To RTOW, it represents a collection of busses that have approximately the same nodal congestion prices and for which is able to compute a weighted average price.

5.6.3. Tradable FTOs between Market Hubs

FTOs are tradable between hubs to the extent that RTO West has released FTOs with these end-points in the primary auction, or has reconfigured bus-to-bus FTOs into the equivalent between these end-points.

5.6.4. How are FTOs re-configured?

How can a FTO from A to C be converted into an FTO from A to B and/or an FTO from B to C? While B might be "on the route" between A and C, in congestion pricing terms it might be very far away. Indeed, its nodal price might be higher than C. Thus it might have no value as a credit in the direction B to C.

Reconfiguration of an FTO into one with different end-points can be done in two ways. Firstly, the holder can sell the original FTO, either bilaterally to RTO West or via the FTO auction, and bid in the auction for an FTO between its preferred end-points.

An alternative is to ask RTO West to replace the old FTO with a new one of 'equivalent value' between the preferred end-points. To do so, RTO West need only re-run the Auction Adequacy Test in incremental mode, to determine what the new FTO parameters (quantity, end-points, % share of residual congestion cost)

The small fee for this service and the requirement to go through RTO West does not restrict transactions in the secondary market, nor diminish the value of the original FTO as a hedge against congestion charges.

6. Day-Ahead, Real-Time Markets, Scheduling and Settlement

RTO West will establish day-ahead and real-time markets for congestion re-dispatch and energy balancing, in which Scheduling Coordinators with dispatchable loads, generators and schedules that satisfy the relevant technical requirements may participate. The market will be comprised of voluntary "inc/dec" bids and offers. An accepted "inc" bid will increase the energy injection at a node in return for payment by the RTO to the Scheduling Coordinator, and an accepted "dec" offer will reduce the energy injection at a node for payment by the Scheduling Coordinator to the RTO. The RTO is effectively buying energy from the inc source, and selling it to the dec – usually at a net cost to the RTO. It may accept any valid inc/dec bids or offers by Scheduling Coordinators that, in the RTO's judgment, can most effectively and economically relieve expected or actual congestion.

At the same time, the RTOW may possibly be seeking bids to supply an anticipated energy shortfall (if any) in load zones, where the total of SCs energy scheduled to be delivered is less than the RTO's forecast of zone load. Such energy balancing bids are indistinguishable from inc bids.

The RTO will not, however, run a day-ahead energy market, which is to say that the RTO will not act as a buyer or a seller in the day-ahead energy market. All Schedule Coordinators will be required to submit balanced schedule requests, which means that each Scheduling Coordinator's injections and withdrawals are expected to be equal (after accounting for transmission losses) on an hour-by-hour basis (or within the hour if the AS/IOS regime requires it).

An Ancillary Services market will be established, within which self-tracking/self-provision of IOS (Interconnected Operations Services) will be allowed[11].

In completing the design of the congestion management and ancillary service markets, RTO West should avoid market designs that would transfer bids from one market into a different market in a way that changes the characteristic of the intended product. For example, if a utility bids capacity into a reserve market, RTO West should be prohibited from accepting that bid to obtain energy for balancing or congestion clearing. This is because the bid was intended for reserve capacity and not intended to provide a substantial delivery of energy. Clearly, the balancing energy and congestion re-dispatch markets are closely related and it may be inappropriate or impossible to fully separate these markets. Nevertheless the design of each should seek to avoid unforeseen and unwelcome consequences to participants.

6.1. Scheduling Overview

6.1.1. Balanced Schedules received from Scheduling Coordinators

Scheduling Coordinators will submit balanced schedule requests. A schedule is balanced when the withdrawal of energy in each hour is matched by an equal quantity of energy injected from the resource (after accounting for RTO West transmission losses).

Schedules of injection and withdrawals will be specified by bus, by hub or by load zone. Each Scheduling Coordinator must balance its scheduled injection and withdrawals for each scheduling hour.

Scheduling Coordinators do not require CTRs or FTOs to cover all of the schedules submitted. Scheduling Coordinators with schedules that are not covered by CTRs or FTOs may qualify their schedule requests by specifying a maximum price they are willing to pay for their share of any congestion cost associated with the schedule. The RTO will accept all balanced schedule requests correctly submitted, and (subject to technical feasibility and its ability to manage any expected congestion) will execute the accepted schedule requests in accordance with Good Utility Practice.

[11] How self-tracking and self-provision will work with respect to the allowed changes to schedules will need to be addressed.

6.1.2. Schedules in three categories:

6.1.2.1. Covered by CTRs

Schedules submitted by Scheduling Coordinators that are covered by CTRs will not be exposed to any RTO hourly congestion charges. The Scheduling Coordinator will receive a credit exactly equal to any positive congestion charge incurred by its CTR-covered schedule - except to the extent that the Scheduling Coordinator makes changes to its pre-schedule during the Schedule Adjustment Period or during Real-Time Operation and the changes extend outside of the CTRs' deadband. Any congestion charges incurred by such changes receive no credit. Schedules for CTR load service within the RTO control area may consist of a portfolio of loads balanced by a portfolio of resources. CTR-covered schedules must conform to the provisions of the pre-existing contracts.

6.1.2.2. Covered by FTOs

Schedules submitted by Scheduling Coordinators that are covered by FTOs will be exposed to the RTO hourly congestion charges appropriate to that schedule. The FTO may produce credits in any hour for the Scheduling Coordinator holding that FTO that can be used to offset (but not exceed) the holder's congestion charges in that hour.

6.1.2.3. Uncovered

Scheduling Coordinators submitting an uncovered schedule with a "market price" are indicating to the RTO that they will accept the appropriate congestion charges, regardless of the cost.

Scheduling Coordinators submitting an uncovered schedule with a "limit price" are indicating to the RTO that they will "self-clear" (automatically withdraw that schedule) when the expected clearing cost of congestion in the Day-Ahead Period exceeds their limit price. Congestion costs are expected to vary hour-by-hour, so that some hours may self-clear and other hours may not. For that reason, limit prices should be specified for each hour of the scheduling day.

6.2. Day-Ahead Re-dispatch Bids

Scheduling Coordinators may voluntarily provide inc/dec bids to the RTO to assist in clearing congestion[12] at any time from the start of the Day-Ahead Scheduling Period (DASP) until real-time (R-T).

[12] A Strawman Proposal for the Scheduling Process is included as Appendix D. This proposal is included merely to illustrate how the flow of the process might work.

6.2.1. What are the basic requirements of bids?

Inc/dec bids must represent dispatchable resources, loads or schedules. These bids may be dispatched by the RTO within [#minutes] minutes of the beginning of the hour of delivery. The bidding Scheduling Coordinator must ensure that the RTO's dispatching instructions are met.

6.2.1.1. Three part bids, to satisfy Congestion/AS/IOS markets (AS workgroup)

6.2.1.2. Energy constrained resources

Scheduling Coordinators may bid energy-constrained resources or loads into the congestion management process. Such bids may be exercised by the RTO for a limited number of hours and that condition will need to be included with the bid.

6.3. Facilitation of Forward Inc/Dec Market

The RTO will facilitate forward inc/dec markets by providing a posting service and encouraging Scheduling Coordinators to bid into it.

6.3.1. RTO entering into a forward position in inc/dec Market

If day-to-day inc/dec supplies become too thin across certain congested locations, the RTO may, from time to time, take forward positions in incs/dec with Scheduling Coordinators in order to maintain system throughput. These forward positions should be made known to all interested parties to provide market information. However, it is the goal of RTO to allow the daily and forward inc/dec markets to operate independently.

6.4. Closing of Day-Ahead Market

The Day-Ahead Period closes at the end of the pre-schedule submission period at [time1] each calendar day.

6.4.1. Lock Down

The period known as "Lock-Down" begins at the end of the Day-Ahead Period at [time1] PAST and extends until [#time2] past the same calendar day. During Lock-Down, no new schedules will be accepted while the RTO evaluates and publishes the expected hourly congestion clearing costs, based upon the inc/dec bids and the schedules submitted. During this time, Limit Price schedules will be cleared in accordance with their declared prices.

6.4.1.1. Schedule Adjustment Period

The Schedule Adjustment Period begins at the end of Lock-Down and extends until [#minutes2] minutes prior to the hour of delivery for that schedule. During this period, schedule changes will be accepted by the RTO under the following provisions:

6.4.1.2. RTO requests Unit commitment for Operating Day Market

The RTO may request "call options" for some of the inc/dec bids received during the Day-Ahead Period. These options serve as unit commitments for generators and can function similarly for loads and schedules in the bid pool. The RTO would use these call options to ensure the availability of the most effective inc/dec combinations during the Operating Day. Payments for these options will be as negotiated.

6.4.1.3. Schedule Adjustments during Operating Day Market

The costs associated with adjusting schedules after the close of pre-schedule will be as follows (noting that with respect to schedules submitted against Catalogued Transmission Rights, all changes must be within contract rights of the underlying contracts in order to qualify for cost exemption under the deadband):

6.4.1.3.1. All schedule changes will be accepted if they do not create additional congestion.

6.4.1.3.2. Schedule changes will be accepted if willing to pay the incremental congestion cost.

If the schedule change causes additional congestion the scheduling coordinator pays for the incremental congestion costs resulting from the schedule change. *[Note: this causes considerable practical difficulty in computing nodal congestion prices. The effect will be to produce several sets: one at Lockdown, and one after each successive Schedule Adjustment that causes congestion is accepted, with a final set of real-time conditions are known. Which set applies to Settlement? And which applies to the Energy Imbalance /AS market? This could really mess up Revenue Adequacy and Imbalance charges]*.

6.4.1.4. Deadband for CTR Schedule Changes

Many pre-existing contracts underlying the CTR have flexibility built into them. A Network Integration Load Service contract under a PTO's former OATT is one example of a contract that inherently assumes real-time flexible delivery service. This flexibility was needed to deal with the minute-to-minute variability of load across a network of transmission-distribution points of delivery, as well as to deal with energy service from a portfolio of generators and purchases. This flexibility normally came without exposure to incremental transmission costs on the Network Service provider's system.

In order to facilitate the market for FTOs, the utilities have agreed to expose some portion of this flexibility to RTO congestion clearing costs. The method for accomplishing this is to impose a "deadband" onto each contract's flexibility. When a contract allows an amount of flexibility to change schedules, the Scheduling Coordinator may make changes to that pre-schedule as needed. As long as the changes are within the contractual rights, then the

Scheduling Coordinator will be exposed to congestion charges only reflecting the amount of change that exceeds the deadband.

6.5. Calculating Congestion Costs and Charges

The process described is designed to achieve a number of objectives:

(i) to allow schedules with CTRs to meet their load service obligations from existing resources at no significantly increased cost of congestion;

(ii) to accept all schedule requests from new entrants and those scheduling outside of their CTRs and, within the scope of the RTO's congestion management scheme, to allow system access to those who value it most;

(iii) to honor the financial hedges associated with the FTOs that accompany some uncovered schedules; and finally

(iv) to set and recover congestion management charges from SCs such that the RTO's congestion management accounts are revenue neutral: i.e. all CM revenues are not less than its total outgoings (for re-dispacth, etc), on an hourly basis.

At the opening of DASP (9am D-1?), the RTO will accept schedule requests from SCs[13]. These will have two flavors: those based on CTRs (which simply specify the quantity to be scheduled, the PORs and the PODs) and those others who additionally specify a price which is the maximum $/MW per hour of congestion charge the SCs are willing to pay for their schedule to be executed. This price may be a limit bid, or a market bid (equivalent to a no-limit bid)[14]

At the same time it receives inc/dec bids and offers from generators and dispatchable loads[15]. At present we assume these are voluntary bids, as the RTO cannot force a generator to trade[16].

---

[13] Open Question is does SC submit 24x1Hr schedules for the day ahead? Or is this a rolling DASP window? Needs to be considered in context of Scheduling Timeline: working assumption is 24x1Hr schedules for next day.

[14] Effect of market bid is to give all such bids equal ranking for system access. No problem unless and until the RTO can't find enough re-dispatch to accommodate market-price RTSs, when it needs to devise a rule to decide which of these to curtail.

[15] Hereinafter, references to inc/dec generators will be understood to include dispatchable loads.

[16] The question remains what does the RTO do in the face of unmanageable congestion? Also, what reserve power will the RTO have to instruct a generator to change its output: and what effect this has on a generator's imbalance revenue/charge? This might amount to the same thing as mandatory bidding.

The RTO processes these schedule requests to identify (i) where it expects an energy shortfall (its own forecast of load to be served versus SCs') and (ii) the location and severity of congestion it expects to be caused by the schedules. Using an approximate CM model[17], the RTO computes the indicative cost of clearing the expected congestion and meeting the energy shortfall, and publishes all available information [on its website] in order to allow all SCs [except those with CTR schedules?] to modify, withdraw or re-submit their request to schedule.

This cycle of bid submission, computation of indicative congestion and cost, and bid modification and re-submission will repeat at intervals [10min? 30min?] during the DASP, until at some time (12noon D-1?) all schedules are locked down. From this time on, no schedule adjustments are allowed, except those within the deadband and those that don't increase congestion. Alternatively, we may allow schedule adjustments outside of any applicable deadband that do increase congestion, provided the SCs submitting these agree to pay any additional cost of congestion [and provided we can work out a practicable way to calculate this additional cost]

At this stage, the RTO makes a final assessment of the volume and location of expected congestion, calculates the cost of clearing this (the Congestion Clearing Price) and determines which schedule requests can be accommodated at this price. It will also identify what resources need to be committed to meet its forecast of energy shortfall, consistent with not aggravating congestion. These are not separate tasks: we assume that the RTO will use a security-constrained LP to find the least-cost resource re-dispatch that balances the system without violating any network or resource capacity limit.

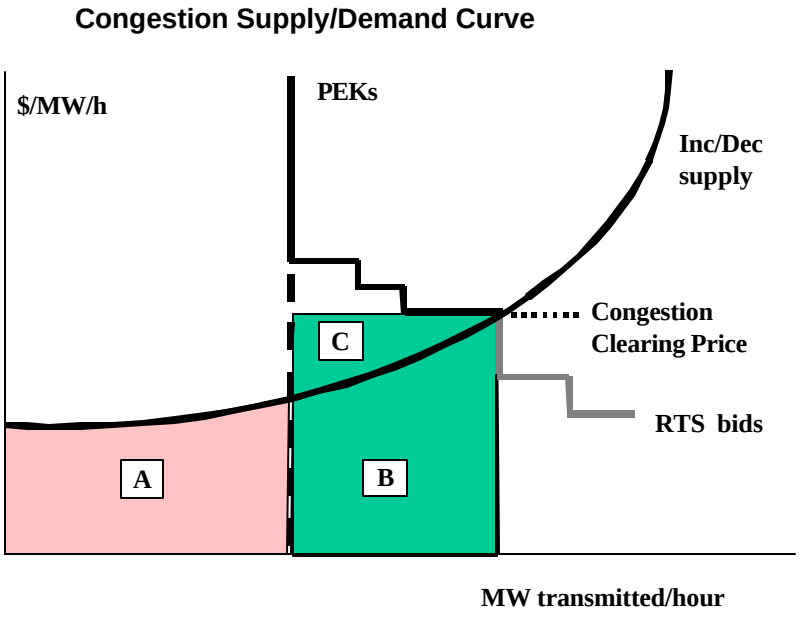
Conceptually we can visualize the LP solution as follows (see diagram below): the RTO combines the schedule requests into a composite 'demand' curve for network access, and forms the inc/dec offers from generators into a re-dispatch 'supply' curve. The intersection of these defines the Congestion Clearing Price. Those RTS schedules that bid below the clearing price are automatically withdrawn by their SCs; those with higher bids (and those with CTR rights) have their schedules accepted.

If the curves don't intersect, the RTO will have to curtail or deny schedules: e.g. first RTS schedules in ascending bid price order, then CTR schedules *pro rata.*

Suppose they do, then the RTO has a least-cost program for resolving expected congestion and meeting the forecast energy shortfall.

---

[17] For example, the RTO might concern itself only with expected congestion on commercially significant paths and ignore (*pro tem*) the small amount of congestion inside the zones connected by these paths (sounds familiar?).



At this point, all accepted schedules become firm, and SCs commit to paying their share of actual re-dispatch costs incurred by the RTO. The RTO [probably] places Call/Put Options with inc/dec bidders to fix the quantities and cap the price of re-dispatch they will deliver if called upon.

6.5.1. Real-Time Re-Dispatch and Paying for Congestion

In real time, the RTO will manage expected congestion by re-dispatching generators under the prevailing system conditions: either from those resources with whom it has placed Call/Put Options, or others if the actual market price is advantageous. [Assume that generator bids are market-based: either the DA forecast price, or the prevailing RT market price].

Assuming the RTO did take action to relieve congestion, it will settle with those generators who were re-dispatched on a 'paid as bid' basis, according to the quantity re-dispatched and the strike price[18].

[18] This needs more detailed work. Can it be managed via the Imbalance Energy Settlement? What about the cumulative effect of successive re-dispatch instructions? An alternative might

6.5.2. Charging SCs for Congestion

The RTO will then calculate the shadow price of congestion across the congested paths/ circuits, and will reflect this onto every other node in the network to develop a set of nodal congestion prices (NB: in an interconnected system, each node will have a different congestion price even if only one circuit is congested). The RTO may, at its discretion, compile selected nodal prices into a weighted average hub price. In doing so it must ensure that it recovers the same revenue from each SC who pays at a hub price as it would have by applying individual nodal prices: it (and the SC) should neither gain nor lose by this. It will publish [on its website] the hourly nodal/hub congestion prices.

Using the nodal prices (or the average price at some convenient hub), the RTO will charge SCs the full amount of their congestion charge (scheduled quantity times nodal price difference of PORs/PODs). SCs with CTR-supported schedules get a 100% rebate, computed as the actual schedule times the POR/POD nodal price: for those with FTO-supported schedules, the rebate is FTO face value times the price difference of the nodes between which it applies.

After all such rebates there may still be some small residual congestion cost (due to forecasting error or changed system conditions, tolerated deviations from schedules, the opacity of the RTO's crystal ball, etc). It is proposed that this be re-charged in a pre-determined combination to (a) PTOs as per their agreed share of liability for CTR support, (b) FTO holders, according to share determined by RTO West in their Revenue Adequacy Test, and (c) uplifted to [all/some] SCs.

The net effect will be to charge RTS-supported schedules the full additional cost of congestion they cause, and CTR/FTO-supported schedule a pre-determined share of the residual cost. Every SC schedule pays at the same nodal price. The RTO clears its congestion accounts and it can be directed to manage the residual cost of congestion to an agreed target figure.

The RTO could go through a pre-settlement calculation such as: find a scaling factor, ~1, that adjusts the raw nodal congestion prices such that its revenue from SC congestion payments $\Sigma(\mathbf{Q}_i \times \mathbf{d}_i')$ exceeds its credits for CTRs and FTOs $\Sigma(\mathbf{CTR}_j \times \mathbf{d}_j' + \mathbf{FTO}_k \times \mathbf{d}_k')$ by at least its cost of congestion re-dispatch (A plus B in the diagram above), subject to the requirement that for each SC:

$$\mathbf{Q}_i \times \mathbf{d}_i' \geq 0, \qquad \mathbf{CTR}_j \times \mathbf{d}_j' \geq 0 \qquad \text{and } \mathbf{FTO}_k \times \mathbf{d}_k' \geq 0$$

Congestion Revenue Adequacy will be guaranteed (after minor adjustment of nodal prices), provided the following holds:

---

be to settle re-dispatch bids on a 'clearing' price basis. This needs more work to determine if it is more efficient, lower cost, more/less prone to gaming than 'as-bid'

Schedules supported by:	SC payments IN	RTO credits OUT	Comments
Catalogued rights (CTRs)	$Q_i \times d_i' \geq 0$,	$CTR_j \times d_j'$	Must balance to zero (Q=CTR)
FTOs	$Q_i \times d_i' \geq 0$	$FTO_k \times d_k' \geq 0$	$Q_i \times d_i' \geq FTO_k \times d_k'$
RTS (pay as you go)	$Q_i \times d_i' \geq 0$,	zero	Must be > zero

7. Long-Term Rights

7.1. Long-Term Rights from Existing Capacity

From time to time, RTO West may offer long-term rights through auction to unencumbered system capacity that is available for a period of time longer than one year. The buyer will receive FTOs associated with the unencumbered capacity over the life of contract of sale.

7.2. Long-Term Rights from a Willingness To Pay Redispatch Costs

RTO West may enter into contracts for long term rights with an entity willing to pay all redispatch costs necessary to create additional system capacity to accommodate schedules defined by such rights under which such entity would receive FTOs associated with increased capacity over the life of the contract.

7.3. FTOs from Expansion

RTO West may enter into contracts for long term rights with an entity willing to pay for the installation of facilities that increase transmission capacity on the system under which such entity would receive FTOs associated with increased capacity over the life of the contract.

8. Interface with other entities

8.1. Seamless Operation with other RTOs

8.2. Internal seams with non-participant utilities

9. Review

The Filing Utilities intend that the RTO West Board of Directors (the "Board") will use its best judgment to balance two important goals for the congestion management system described in this paper: (1) providing adequate opportunity for the congestion management system and the markets that support it to mature and to work out initial minor "kinks"; and (2) protecting PTOs, market participants, end use consumers, and transmission system reliability from unreasonable exposure to harm if there are aspects of the congestion management system that prove unworkable.

The Filing Utilities therefore contemplate that the Board will have, from the beginning of RTO West's commercial operations, the authority to modify the congestion management approach set out in this document if circumstances warrant (subject to certain principles described below). If the Board sees no need for change, it need not make any.

At the end of three years of commercial operations, however, the Board will have an obligation to conduct a thorough, formal evaluation of RTO West's congestion management system. The Board will then need to decide whether it believes the best course is to continue with the congestion management system as then in effect or to modify it.

If the Board elects to modify the congestion management system (either during the initial three years of commercial operation or because of its formal evaluation at the end of three years), it must do so in a way that neither expands nor diminishes whatever transmission- or congestion-related rights are then outstanding (whether based on pre-existing contracts or load service obligations or on FTOs purchases directly from RTO West or in the secondary market). In addition, any modified approach to congestion management the Board adopts must conform to the following principles:

a. accommodates broad participation

b. sends efficient price signals to all users about the consequences of their transmission usage decisions

c. the generation that gets re-dispatched (from the voluntary re-dispatch bid stack) is the least cost to relieve the expected congestion

d. transmission rights are used by those that value them most highly

e. sends signals for appropriate investment (generation, including generator location; transmission; demand-response; etc.)

f. facilitates development of hedging tools

g. liquidity and tradability

h. doesn't impede reliability

i. ability to detect and respond to gaming and market power abuse

j. broad seamless market

k. subject to "rationality" test – proportionality between costs incurred and benefits to customers

l. preserves protection to parties holding pre-existing transmission rights for the terms of those rights. [***NTD:*** *Is this last principle redundant with the first sentence of the lead-in paragraph?*]

Appendices

A Terms and definitions

Key Defined Terms and Acronyms

PTO
FTO
LSO
CTR
CTR Service Pool
RAS
SC
Eligible Customer
inc
dec
Good Utility Practice
DASP
LP
Congestion Clearing Price
RTS
OATT
Deadband
PNCA
MCHC
MW
LockDown
Board

B RTO West Congestion Management Maps and Examples

C FTO and Congestion Clearing Example

Appendix D **Strawman Proposal for the Scheduling Process**

Assumes that pre-schedules consist of 24 schedule-hour (adjusted for changes to/from daylight savings time) amounts in whole megawatthours each hour.

A schedule is balanced when each hour's energy requirement is matched by an equal energy resource.

Early a.m. preschedule day:

- RTO posts region-wide weather forecast and its hourly control area load forecast.
- SC provides to RTO an hourly load forecast for its retail loads within RTO control area, by "load zone" (collection of electrically similar transmission delivery buses). Load forecast should include distribution losses *and transmission losses*.
- SC provides to RTO hourly forecast of its wholesale energy obligations by delivery bus.
- Process begins for SC provision to RTO bids for Interconnected Operations Services (IOS) and inc/dec bids for congestion clearing.
    - The bids will be in the form of "incs", which effectively increase resources at a node in exchange for payment by the RTO, or "decs" which effectively decrease the resources at a node in exchange for payment by the SC to the RTO. Incs and decs may represent generation, loads or schedules of imports or exports, or any other means that provides the desired effect.
    - Bids are posted on website to provide transparent price signals

.

Later a.m. preschedule day:

- RTO provides SCs with estimated amounts of Ancillary Services (A/S) for which each SC will be responsible.
- SCs make arrangements for A/S by self-provision, in bilateral markets, in A/S exchange or with RTO as provider of last resort.
    - Self-tracking SCs are responsible for acquiring load following from other than the RTO.

- RTO posts differences between its own load forecast and those provided by SCs.

Prior to Lock-Down time preschedule day:

- SCs provide balanced preschedules to RTO:
    - SCs responsible for retail load will provide preschedules of withdrawals by load zone and resource injections to balance the withdrawals. Resources may be injected at buses or hubs.
        - For load service covered by Catalogued Transmission Rights (CTRs), the SC may provide a prescheduled portfolio of injections and withdrawals, meaning that resources and loads do not necessarily need to have specific bus-by-bus pairing. However, this preschedule must be balanced and feasible within the provisions of all contracts underlying its CTRs and should reference the catalogue number.
        - For load service not covered by CTRs, the injections and withdrawals must be paired up.
    - SCs scheduling wholesale transactions must provide similarly balanced injections and withdrawals. Injections and withdrawals may be bus-to-bus, bus-to hub, hub-to-hub or hub to bus.
        - Wholesale transactions covered by CTRs may also be handled on a portfolio basis, if that reflects the nature of the underlying transaction contract. The catalogue number must be provided at time of scheduling.
        - Those wholesale transactions not covered by CTRs must be scheduled by injection-withdrawal pair.
- SCs may provide limit prices for their schedules that are not covered by CTRs. Schedules with limit prices will self-clear by being withdrawn automatically, if those schedules would otherwise incur estimated congestion clearing costs above the limit price.
- The RTO accepts all preschedules that meet the above criteria.
- SCs must also provide preschedules of Ancillary Services to meet the requirements indicated by the RTO.

During Lock-Down on the preschedule day:

- The RTO refuses to accept new schedules or changes to preschedules.
- The RTO evaluates scheduled grid operation for congestion and calculates and publishes node prices.
- The RTO informs SCs whose schedules have self-cleared due to limit pricing.
- The RTO may begin to acquire inc/dec "calls" for the following day.
- [If a two-step settlement process for congestion management is used, the RTO will determine settlement charges]
- The RTO runs a system analysis to establish the baseline congestion costs for the purposes of determining incremental costs for schedule changes.

<u>During the Schedule Adjustment Period (preschedule day and into the Day of Delivery):</u>

- At the end of the Lock-Down period, the Schedule Adjustment Period begins.
- SCs may provide the RTO with changes to schedules under the following rules:
    - All schedule changes that do not produce additional congestion will be accepted unconditionally.
    - Schedule changes that do produce additional congestion will be subject to the incremental costs of clearing the congestion, with the following exceptions:
    - For schedules covered by CTRs: If the schedule change creates additional congestion and the cataloguing process identifies the non-converted contract as having defined flexible rights, the scheduling coordinator can make changes within a defined "deadband" without being charged for RTO congestion clearing costs. Note also that schedule changes that result in incremental congestion outside the deadband will be subject to charges only for the amount of congestion outside the deadbands.
    - Scheduling coordinators experiencing a bona fide contingency due to a forced outage of generation or transmission, or an uncontrollable loss of a scheduled import or export, will have their requests for schedule changes accommodated to the extent possible.
- The Schedule Adjustment Period ends at XXX minutes before the beginning of the hour of delivery for the hourly schedule in question.

- Beginning YYY minutes before the beginning of each hour of delivery, the RTO begins to exercise its call options for congestion management and IOS, using the least-cost solution from the stacks of bids and its evaluation of the effectiveness of the offerings.

Real-Time Operation (from end of the Schedule adjustment Period through the end of the hour of delivery):

- The RTO dispatches its IOS and congestion management resources to effect the schedules and deal with contingencies.
    - Schedule changes may be requested by SCs to deal with their own contingencies and unexpected load changes.
    - Schedule change requests purely for economic reasons should not be honored, unless allowed by pre-existing contracts, in which case deadband rules apply.

End-of-Hour Settlement Calculation Period:

- The RTO accumulates the data needed for settlements.
- The RTO accomplishes checkout with adjacent control areas. This will confirm the final import and export energy schedules to be used by the RTO for settlements with the SCs.

RTO West:

Transmission System Congestion Management

Preliminary Discussion Draft – Methodology B

December 14, 2001

DRAFT – DRAFT – DRAFT – DRAFT

RTO West Congestion Management

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RTO West - Congestion Management

Introductory Notes:

This draft white paper represents a work in progress. The purpose of releasing a draft at this time is to enable interested parties to get a sense of how work to date on a Stage 2 congestion management proposal is taking shape.

This congestion management proposal described in this draft white paper has, so far, been developed independently of work on a revised Stage 2 pricing proposal. The process of making sure that the congestion management proposal and the pricing proposal mesh smoothly with each other is yet to come, so there may be inconsistencies.

The concepts contained in this paper do not represent an agreement by any of the Filing Utilities to go forward on the basis of these concepts. No Filing Utility has committed that any concepts, taken together or individually, would be acceptable to it.

Where this paper notes a particular concern of one or more Filing Utilities, that notation should not be taken to imply that other areas where concerns are not noted are acceptable.

The goal in developing the proposal embodied in this paper is to create a package that is internally consistent to enable all interested parties to evaluate the concepts as a complete package. All Filing Utilities reserve the right to comment on or disagree with any aspect of this proposal.

1. Introduction

1.1. Overview of Proposed Congestion Management Approach.

The approach described below is based on a system of financial rights tied to particular points of injection and withdrawal on RTO West transmission system.

Under current practices, utilities manage congestion based on viewing all schedules submitted in the aggregate. This allows utilities to net schedules consistent with reliability principles. In effect, loads are served by pooling available transmission assets and other techniques to provide reliable service at least cost to customers. This congestion management proposal intends that RTO West will extend this basic philosophy to the transmission systems of all PTOs under its control. In providing reliable service associated with CTR service (described below), RTO West will aggregate all obligations and determine unused available transmission accordingly.

The approach is based on a combination of voluntary decisions and positive incentives designed to balance protection of existing uses/rights with the need for a new, more liquid market

structure. This approach recognizes that an acceptable congestion management model must not interfere with the ability to serve load reliably or cause involuntary price shocks.

For those participants who view increased liquidity in transmission markets as critical to the success of an RTO, there are specific assessments and tools to enable RTO West to promote release of unscheduled capacity into the primary or secondary trading markets. For those that believe that moving to a more market-based congestion management approach should not increase price risk to loads that have paid for existing rights and facilities, the decision to convert existing contract rights is completely voluntary. At the same time, the approach described below contemplates that there will be incentives to promote voluntary conversion of existing rights into tradable financial rights, so that more capacity will be available in secondary markets.

1.1.1. "Accept all schedule requests "

All transmission users will be allowed to "schedule" their energy transactions with RTO West. RTO West will receive these schedules and using a security constrained least cost economic analysis, RTO West will determine if transmission congestion is anticipated and take least cost actions to accommodate schedules that are willing to pay for the congestion cost.

1.1.2. Financial Hedge

This congestion management approach is a model where the tradable product is a financial congestion hedge. That is, the transmission right is an "option" or credit against congestion costs incurred in the hour. This credit cannot become a negative value that would impose an obligation to pay on holder of the Financial Transmission Option (FTO).

1.2. Seamless West-wide Congestion Management Framework

Any congestion management system RTO West implements must coordinate operationally with neighboring RTOs. This topic is addressed in Section 8.

1.3. Relationship to other RTO processes

1.3.1. Pricing

It is anticipated that this congestion management approach will be at least revenue neutral or positive. That is, over time the overall cost of congestion will not result in large accumulation of costs, which would require a significant change in RTO West pricing structure.

1.3.2. Ancillary Services/IOS

Congestion management and the provision of ancillary services are tightly related energy markets. It is therefore expected that the pricing of the AS/IOS markets will be compatible with bidding for and pricing of services to manage congestion on RTO West system.

2. Congestion Model

2.1. What Are FTOs?

An FTO is the right of the holder to receive a credit from RTO West equal to the value of the right calculated by multiplying the congestion price at the points of injection less the congestion price at the points of withdrawal by the quantity of power in megawatts described in the FTO for one hour. An FTO is described by a quantity of power between an injection and withdrawal pair.

An injection point is a bus within the system. [We're not sure this is the right definition]

A withdrawal point is a bus within the system. [We're not sure this is the right definition]

[*NOTE:* *We need to consider whether injection and withdrawal points may in some cases need to be more broadly defined than as single busses, (such as by nodes). A node can be a set of busses where it is useful for operations or defining classes of facilities. Resolution of issues related to busses, node, and hubs may need to wait for further work on how ancillary services will work.*]

Hubs are well recognized pricing points that are used to facilitate liquidity in FTO auctions and secondary FTO trading. [We're not sure this is the right definition]

2.1.1. FTOs Are Settled as Credits Against Congestion Caused by Schedules

The Scheduling Coordinator that redeems an FTO on behalf of the holder receives a credit equal to the value of the option, regardless of whether the holder schedules power between the specific injection and withdrawal points described in the FTO.

The credits resulting from an FTO for a particular hour cannot exceed the amount of congestion costs associated with the holder's schedules that were honored on that particular hour. The ability to receive the credit expires at the end of the hour to which the FTO is tied.

An FTO may be traded until (but not after) the schedules that will determine the FTO value are submitted. RTO West will implement a system to track ownership of FTOs.

Sets of FTOs may be subdivided into units as small as a single MW for one hour, and may be traded on the secondary market.

2.1.2. Managing CTR Service.

As explained in more detail below, existing PTO transmission service obligations (existing contracts or LSOs) that are not converted to FTOs will be catalogued and expressed as

"Catalogued Transmission Rights" or "CTR." RTO West will manage CTR service on an aggregate basis.

An "existing contract" means (1) a contract in effect on [date] that provides for service to load within RTO West service area; (2) a contract in effect on [date] to import or export power within RTO West service area, or (3) any other contract for transmission service (other than nonfirm service) on RTO facilities in effect on [date]. LSO is a load service obligation that is not currently described by a contract, but nonetheless is an obligation of a PTO.

3. Cataloguing Existing Contracts and LSOs

3.1. Introduction

The catalogue will define for RTO West the extent and characteristics of obligations that RTO West will need to serve, on demand, for each PTO (or representative Scheduling Coordinator, in the event the PTO and affected rights-holder wishing to take service directly from RTO West agree on the CTRs) and the associated assets that the PTO will make available to RTO West to make good on its obligations. These catalogued assets may exceed, but cannot be less than, the minimum set necessary to fulfill those obligations.

Because PTO obligations are expressed in many different contracts with many different provisions, the catalogue is needed to provide RTO West a standardized benchmark against which RTO West will be able to see if a schedule is within its pre-existing transmission rights. The catalogue of a PTO's obligations and assets will also give RTO West information to use in testing the sufficiency of the PTO's assets to meet the PTO's obligations (test for overselling) and if necessary work out with the PTO what additional assets are needed by RTO West to make good on the PTO's obligations.

3.2. Expanded Definition

RTO West will have the obligation to provide service on behalf of the PTO for pre-existing contracts and Load Service Obligations that are not converted to RTO service.[1] When the transmission rights associated with these obligations are used, RTO West will take into account the net affect of all these schedules in determining the capacity available on the system for other uses. This pooling of rights will be across the entire RTO network in order to maximize the available space on the transmission system.

The catalogued rights are not tradable through the RTO West sponsored transmission market and do not expose the holder to congestion costs unless otherwise provided in the underlying agreements. The transmission right one has within the pool is defined by the underlying

[1] i.e., an obligation to FTOs based on the underlying contractual rights

transmission contract or obligation that is catalogued and uniquely identified. These rights are referred to as Catalogued Transmission Rights or CTRs. These rights can only be used between the injection/withdrawal points identified in the catalogue (as then in effect) and for the amounts identified.

Customers taking transmission service under pre-existing contracts catalogued as CTRs may continue scheduling service from the PTO regardless of the operation of RTO West. Alternatively, the customer may prefer to take over responsibility for scheduling within those CTRs. This proposal is written to enable both pathways. Once rights and obligations are catalogued as CTRs and both the PTO and the PTO's transmission customer (rights holder) agree on the result, the rights holder should be able to arrange for scheduling within those rights directly with RTO West as the service provider. Any costs associated with schedules submitted by rights holders outside of agreed-upon CTRs would be the responsibility of the rights holder. This proposal also envisions a process for cataloguing rights and assets in which both the PTO and the rights holder would participate. Dispute resolution would be available as the ultimate end point of that process. The process should encompass both initial cataloguing and updates. Even though the PTO has the responsibility to submit the list of rights and assets to RTO West, that submittal must recognize the process for those rights holder that committing to develop a scheduling relationship with RTO West for their CTR service.

A CTR entitles the holder to receive a credit equal to whatever congestion charges are associated with a schedule submitted on its behalf that is consistent with its catalogued rights.

Transactions by the catalogued rights holder that do not conform to its catalogued rights are subject to congestion costs. Catalogued rights that are not scheduled do not generate any credits.

3.3. PTO Obligations to Support CTR Service

To enable RTO West to take on the responsibility of managing the CTR service, the PTO will be responsible for providing RTO West with a detailed catalogue of its obligation that it expects RTO West to meet and the resources that it will provide RTO West to meet such obligations. These means will include physical facilities (such as wires and poles, phase shifters, and other equipment that affects the ability to transmit power), contract rights to use capacity on others' facilities, as well as operational or contractual mechanisms such as RAS and redispatch services or other agreed-upon PTO commitments. For purposes of this paper, these collective means of satisfying obligations are referred to as PTO "assets."

So long as the assets are sufficient to meet the obligations, RTO West will be able to fulfill all PTOs' obligations without cost-shifts. Over time conditions will change, resulting in the possibility that the PTO's obligations or assets might change. Therefore updates to a PTO's obligations and assets are necessary for RTO West to assure itself that sufficient assets are available to meet the revised obligations without shifting costs to other customers.

3.4. Rules for CTR Use and Assignment of Rights to Others

If a PTO and a rights-holder agree on catalogued rights, the rights-holder may elect not to schedule service under its pre-existing contract through the PTO, but instead to schedule directly with RTO West (through a Scheduling Coordinator) under the terms of the CTR. The Scheduling Coordinator will submit a schedule to RTO West and identify the catalogue number that supports the schedule. RTO West will verify that the schedule fits within the parameters as listed in the catalogue. As long as the schedule fits within these parameters, the Scheduling Coordinator on behalf of the rights-holder will receive a credit equal to any congestion costs associated with the schedule. The exception would be if the underlying contract made the contract holder subject to congestion costs that might be identified by curtailment procedures, redispatch costs, etc. If the schedule does not meet the parameters identified in the catalogue, then the Scheduling Coordinator on behalf of the rights-holder will be subject to congestion costs associated with that portion of the schedule not covered.

CTRs can be reassigned to the extent that the underlying contract or obligation allows reassignment or a legal requirement mandates reassignment. Typically, reassignment means the permanent assignment of the rights to a third party, whereas, trading can be a temporary rent of a right by a third party.

3.5. Catalogue of Obligations and Assets

3.5.1. Rules for Cataloguing Obligations and Assets

3.5.1.1. Update to Obligations and Assets

Updates to a PTO's obligations and assets will be necessary whenever there is a substantial change in the underlying conditions (that would have been accounted for in the underlying contract) or assumption in the current catalogue. Updates will at a minimum, need to occur once per year. The update of the PTO's catalogue needs to be coordinated to fit with the timing of FTO auctions.

3.5.1.1.1. Changes in Obligations

Obligations may include service that is tied to a variable such as loads or obligations may be altered over time. Any of these situations may cause an update to occur.

3.5.1.1.2. Load growth[2]

If a PTO's catalogue includes service to firm load and the service also has provisions for load-growth, RTO West will need annual updates of load forecasts. Such load forecast should be by month for both on-peak as well as off-peak demand. The PTO (or jointly with affected rights-

[2] The changes in load growth may need to be linked into Pricing.

holder wishing to take service directly from RTO West that so choose) will modify its obligations to reflect the increase (or decrease) in load service. Given that the PTO must submit to RTO West a balanced set of obligation and assets, the amount of load growth will naturally be limited to capacity on the PTO's transmission system (unless the PTO takes some other action such as redispatch to make good on the obligation that exceeds capacity).

3.5.1.1.2.1. To reflect changes in contract provisions, Tariffs, Business Practices, and Scheduling Provisions.

If a PTO's catalogue of obligations would be affected by a change in contract provisions[3], or if a change in the PTO's Tariffs, Business Practices, or Scheduling Provisions would affect the catalogue then the PTO (and affected rights-holder wishing to take service directly from RTO West that so choose) will need to update its catalogue. A change in a pre-existing contract provision (sufficient to require an update to the catalogue) may include: 1) changes agreed to by the contract right holder and the PTO (e.g. change to a POD), 2) changes based on contract rights exercised by the contract right holder (e.g. rollover rights), and 3) changes required by an arbitrator, court, or regulatory body having jurisdiction over the PTO.

3.5.1.1.3. Changes in Assets

RTO West and the PTO may need to update the catalogue if there are changes to the PTO's assets after initial cataloguing.

3.5.1.2. Cataloguing Obligations

The catalogue of obligations should define for RTO West in standardized terms the bounds or range of transmission rights the PTO has committed to provide.

3.5.1.2.1. Term

The term defines the start and end date during which the obligation is to be honored.

3.5.1.2.2. Injections

The catalogue will include specified injections, which will be defined in terms of nodal[4] locations and maximum amounts to be honored (at each node). The sum of the maximum amounts at the injection nodes may not equal the sum of the maximum amounts at the withdrawal nodes.

[3] Including, but not limited to a rights-holder's decision to participate in RTO West.

[4] The nodes that RTO West uses in cataloging CTRs may be defined as busses (granularity) or may be some aggregation of busses. This needs to the resolved.

3.5.1.2.3. Withdrawals

The catalogue will include specified withdrawals, which will be defined in terms of nodal locations and maximum amounts to be honored (at each node).

3.5.1.2.4. Special Rules

The catalogue will also include special rules, which will define exceptions to the standard rules (e.g. exceptions to the rules governing deadbands (as explained below under Section _)). To the extent that there are special limitations or exceptions that cannot be captured by the set of injections and withdrawals, special rules would be included to govern the use of the catalogue. This may be in the form of interdependency between nodes (e.g. injection limit at node A is 100 MWs and injection limit at node B is 75 MWs, however the sum of injections at A and B must not exceed 125 MWs). (Note: the concept of a "node" needs further work and discussion.)

3.5.1.3. Cataloguing Assets[5]

The PTO shall submit to RTO West a catalogue of assets (which must include all of the physical facilities RTO West will operate on behalf of the PTO)[6] that it will make available to RTO West to satisfy the catalogued obligations. As noted above, these assets may include various tools other than physical facilities, which are described below.

3.5.1.3.1. Physical Facilities (hardware including items such as phase shifters)

The catalogue will include a list of facilities and hardware including transmission facilities, phase shifters, etc.

3.5.1.3.1.1. Special rule for expansion.

A PTO that has expanded its transmission capacity to meet its catalogued obligations shall reflect such increased capacity in its catalogue of assets. In the event that the PTO has not committed the use of all its expanded capacity the PTO shall submit for RTO West's approval its request to convert the unused capacity to FTOs (defined with points of injection and withdrawal on either end of the expansion). After RTO West tests the conversion for adequacy, the PTO can include in its catalogue of obligation the FTOs approved by RTO West. These FTOs are treated like any other FTOs.

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[5] It is recognized that to the extent that a PTO has included load growth in its catalog of obligations that it may choose to serve it from existing facilities or from new facilities resulting from system expansion.

[6] These physical facilities are all of those that must be included in the transmission facilities exhibits to RTO West Transmission Operating Agreement (a.k.a "Class A" and "Class B" facilities).

3.5.1.3.2. Operational & contractual mechanisms (including curtailments, RAS, redispatch, etc)

The catalogue will include a list of operational or contractual mechanisms made available to RTO West to assure that the catalogued obligations can be honored under a range of contingencies (e.g. line outage, nomogram restrictions, extreme coincidental use). Operational mechanisms may include RAS, redispatch services, and curtailment rights under pre-existing contracts.

Redispatch obligations are made available by 1) physical adjustment of appropriate generating resources, 2) contractual rights to redispatch services, and 3) rights to curtailment of schedules of pre-existing contracts[7]. As an alternative the PTO may choose to have RTO West secure redispatch services with the PTO's commitment to pay such costs or may monetize such redispatch obligation (assuming that RTO West and the PTO can agree on the amount).

3.5.1.4. Procedure for Cataloguing

The following steps need to be completed anytime a catalogue of obligations and assets need to be established or updated.

3.5.1.4.1. Rights Holder Opportunity to Participate

The PTO shall undertake a process to jointly determine the CTRs for any rights-holder wishing to take service directly[8] from RTO West.

3.5.1.4.2. Type

The cataloguing process will reflect the types of obligation embodied in the underlying contract or LSO, examples of which are described below. (These are not intended to describe an exhaustive set.) Although cataloguing rules for each PTO will be the same, there may need to be unique rules to govern the cataloguing of different types of obligations.

3.5.1.4.2.1. Load-based Obligation

The load-based obligation category covers obligations that are tied to following firm load (LSO and NT contracts are examples). The location of the load defines the set of withdrawals with maximums based on the actual load served. Because the load is not known ahead of time, the catalogue will use an estimate of the maximum based on a load forecast. RTO West will be

[7] such rights must be maintained even if the pre-existing contract right had been converted to a FTO.

[8] Taking service from RTO West does not imply that the CTR has been converted to FTOs but does imply that the rights-holder has or will establish a direct on-going operational relationship with RTO West.

given a revised maximum at pre-schedule. The set of injections will be based on the physical and contract resources used to serve such load. While the maximum injection at each node is equal to the physical capacity of the system, the sum of the injections should not exceed the corresponding contract obligation at the time of injection. For physical facilities or for contract resources the generation limit that is specified in such contract shall govern.

Some load-based obligations (e.g. General Transfer Agreement or GTA service) represent network and point-to-point service across more than one PTO system. The transferring PTOs will catalogue[9] the rights from the Points of Replacement to the Points of Delivery much as the other load-based obligations above. Restrictions and Ancillary Services would be addressed in the Special Rules section.

3.5.1.4.2.2. Demand based

The demand-based obligation category covers obligations that are tied to a contract that specifies demand limits. For most contracts the demand is fixed and the procedure is fairly straightforward. The points of delivery define the set of withdrawals with maximums based on the demand specified in the contract. The set of injections will be based on the points of receipt or points of integration with maximums based on the demand specified in the contract. Some demand-based contracts act like ownership-based contracts and would need to be catalogued in a similar fashion (see the description under Ownership for the appropriate catalogue rules). An example of such a contract would be a contract that gives a right to transmit between points A and B in both directions so long as the net usage is within the demand limit for that direction. In that case the catalogue rules for a bi-directional, simultaneous "ownership-based" contract would be appropriate.

3.5.1.4.2.3. Ownership

The ownership obligation category covers obligations that are tied to ownership (either direct or by lease) of a transmission facility. The point of injection and point of withdrawal are defined as either end of the transmission line segment (for examples assume the bounding nodes are A and B and the line rating is 100 MWs from A to B and 75 MWs from B to A). Ownership rights may take the form of bi-directional and simultaneous use, bi-directional and non-simultaneous use, or uni-directional use (the rules for which are described below). Because each form has slightly different implications they will need to be treated differently.

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[9] For example a GTA between PTOs would show up in the catalog of both PTOs. The PTO receiving GTA service would show it as a contractual asset and the PTO providing GTA service would show the contractual obligation.

3.5.1.4.2.3.1. bi-directional and simultaneous use

The bi-directional and simultaneous use category is for contracts under which the rights holder has the ability to use the path in either direction and at the same time. The net of the two schedules must be within the line rating for the net flow. For example assume schedule 1 is 200 MWs injected at A and withdrawn at B, schedule 2 is 125 MWs injected at B and withdrawn at A. This nets to 75 MWs injected at A and withdrawn at B. Note that each schedule individually exceeds the path rating (assumed in this example to be 100 MW) but that the net use is within the rating. This implies that the two schedules must be linked and that if one schedule is altered then the other schedule must be adjusted so that the net use is within the applicable path rating. The catalogue for this type of obligation would show both points as injections and both points as withdrawals. The maximums would be governed by special rules that would represent the interdependency (injection (A) - withdrawal (A) must be between +100 and –75 and injection (B) – withdrawal (B) is between +75 and –100).

3.5.1.4.2.3.2. bi-directional and non-simultaneous use

The bi-directional and non-simultaneous use category is for contracts under which the rights holder has the ability to use the path in either direction but not at the same time (up to 100 MWs from A to B OR up to 75 MW from B to A). The catalogue for this type of obligation would show both points as injections and both points as withdrawals with the associated directional line limits as the maximum (in this example Injection set = [100 @ A, 75 @ B] and Withdrawal set = [75 @ A, 100 @ B]).

3.5.1.4.2.3.3. uni-directional use

The uni-directional use category is for contracts under which the rights holder has the ability to use the path in only one pre-defined direction (up to 100 MWs from A to B). The catalogue for this type of obligation would be similar to a uni-directional demand based contract (e.g. PTP) in that there is a single point of injection and a single point of withdrawal specified with the associated directional line limit as the maximum (in this example Injection set = [100 @ A] and Withdrawal set = [100 @ B]).

3.5.1.4.2.4. Regional Coordination Agreements (PNCA and MCHC)

The regional coordination agreement category is for obligations that are tied to multi-party resource operating agreements. Since these agreements are resource based (rather than load-based) transfer of power can be viewed to be between resources. Since service to load is not guaranteed through these agreements the rights holder would be responsible to get power from their resource to their load via a separate transmission agreement. This means that both the points of injections and points of withdrawals are defined at the resources identified (and coordinated) in the agreements. Since each agreement has slightly different implications they will need to be treated differently.

3.5.1.4.2.4.1. Pacific Northwest Coordination Agreement

The catalogue should capture the range of possibilities of PNCA transactions (In Lieu Energy, Provisional Energy Return, Interchange Energy, etc.). The points of injections and points of withdrawals would be each of the Coordinated System resources (as submitted annually in PNCA planning). This sets up a resource-to-resource exchange where each party's normal load serving transmission agreements would be used to take the energy from its resource to its load). The maximum amounts of injections and withdrawals would be based on the most recently completed annual operating plan and the interchange estimates derived from the range of maximum and minimum Interchange Energy amounts out of the annual PNCA Headwater Benefits study. The catalogue for PNCA transactions should be updated annually after the PNCA Final Regulation is complete (to capture resource additions and operating plan changes).

3.5.1.4.2.4.2. Mid Columbia Hourly Coordination Agreement

Given the real-time nature of MCHC operations and the close proximity of the resources included in MCHC, the MCHC projects should be grouped into a single node for cataloguing purposes. The range of possible uses of MCHC on a "bus-to-bus" basis are so large that utilization of multiple nodes would necessitate a significantly large dead-band. [Add note here about perhaps handling as a matter of regulation or dynamic scheduling, rather than schedule adjustments]

3.5.1.4.3. PTO Inventory

The PTO (or jointly with affected rights-holder wishing to take service directly from RTO West) shall identify all obligations it has to provide transmission service that it requires RTO West to fulfill by providing the details specified above in catalogue obligations. The PTO shall also identify the associated assets it shall make available to RTO West to fulfill such obligations by providing the details specified above in Catalogue Assets. The PTO shall submit to RTO West a catalogue of assets that is at least sufficient to meet the catalogue of obligations.

3.5.1.4.4. RTO Assessment

RTO West shall make a determination of the sufficiency of the PTO's catalogue of assets to meet the catalogue of obligations[10] using an open and public process that allows for comment and input by affected third parties. In making this determination of sufficiency, RTO West will only consider the assets and obligations submitted to it by the PTO.[11]

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[10] RTO West will need to have adequate tools to be able to make this determination.

[11] The implication is that the incidental use of the PTO's assets by another PTO or a third party (leakage) should not factor into the determination of sufficiency.

NOTE: There is a difference of views on the question of whether the assets supporting various CTRs or schedules must be separately identified to match up with the schedules that are submitted.

3.5.1.4.5. RTO West Acceptance of Individual PTO Catalogue

There are many possible reasons for a PTO's catalogue of assets to be insufficient to meet its catalogue of obligations: load growth may exceed capacity on the PTO's transmission system, there may be errors or omissions in the data, there may be a change in circumstances (e.g. assumed generation patterns), or the PTO may have over-committed its assets (oversold). If RTO West determines that the PTO's assets are not sufficient to meet its obligation then the PTO and affected rights-holder wishing to take service directly from RTO West will have the opportunity to review the assessment, correct errors or omissions, revise its assets or obligations, or attempt to resolve the disagreement with RTO West. RTO West is not obligated to accept a PTO's catalogue that RTO West determines is not sufficient unless the PTO makes some other arrangement acceptable to RTO West.

[***NOTE:*** *There is a concern that this language doesn't address other PTOs' ability to respond to the effect one PTOs' "balance sheet" might have on them*.]

3.5.1.4.6. RTO West Aggregate Assessment of PTOs' Assets and Obligations

RTO West will make a determination of the sufficiency of the aggregate (all PTOs') assets to meet the aggregate obligations.[12] If RTO West finds that the aggregate assets are insufficient to meet the aggregate obligations then RTO West shall take the following actions:

3.5.1.4.6.1. Identify impacted PTOs.

RTO West will consult with those PTOs that have assets or obligations associated with the problem path.

3.5.1.4.6.2. Identify actions to correct problem.

RTO West and the impacted PTOs and affected rights-holder wishing to take service directly from RTO West shall identify and agree upon[13] what actions should be taken (either by the PTOs and their affected rights-holder or by RTO West) to get the total obligations and total assets to match. If the parties cannot reach agreement, they must resolve it through RTO West's dispute resolution process.

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[12] RTO West will need to have adequate tools to be able to make this determination.

[13] The involvement and consent of the affected rights-holder is limited to those items that directly affect the rights-holder.

3.5.1.4.6.3. Agree on cost sharing.

RTO West and the impacted PTOs shall agree upon the mechanism for the impacted PTOs to allocate such costs. If the parties cannot reach agreement, they must resolve it through RTO West's dispute resolution process.

3.5.1.4.6.4. RTO West's Catalogue.

RTO West will also maintain a catalogue of obligations and assets. RTO West shall record in its catalogue of assets the actions agreed upon by the impacted PTOs and RTO West.[14] Because RTO West's assets are to meet obligations already defined by the PTOs' catalogue, there will be no adjustment to RTO West's catalogue of obligations.

3.5.1.4.6.5. Dispute Resolution.

With respect to cataloguing of PTO assets and obligations, this paper envisions a process that is not yet fully defined. In the event parties cannot agree that the catalogue does not adequately represent the rights and obligations of a contract, this process would conclude with RTO West's dispute resolution process.

3.5.2. Cataloguing Errors

Any errors in cataloguing will be corrected promptly upon discovery by reference to the underlying contract that governs the right.

RTO West will correct any billing error resulting from a cataloguing error that is discovered before the bills become final. Any billing disputes that arise as a result of a catalogue error will be resolved through RTO West's dispute resolution process.

[***NOTE:*** *Need to decide when bills become final and non-appealable. This and related issues were worked on by the billing and settlements group.]*

3.6. Transmission Required for AS/IOS & Losses

In developing its catalogue of obligations and assets, the PTO will include requirements for transmission to fulfill any obligations related to ancillary services and losses in existing contracts.

[***NOTE:*** *This may be modified to reflect the outcome of further work on ancillary services.*]

3.7 Contingency and Curtailment

[14] The actions may consist of reductions of the PTOs' obligations, which would be represented as a curtailment right under RTO West's assets.

[***NOTE:*** *This area requires careful thought and analysis.*]

4. Creation of Tradable Rights

4.1. Conversion

The conversion of a CTR to an FTO provides a mechanism for rights-holders to convert their existing transmission rights to a tradable right. This right is open only to CTR holders that are willing to establish a relationship with RTO West through a Scheduling Coordinator. The conversion is subject to RTO West's approval and must meet two principles. The conversion must not exceed the underlying rights and the associated PTO (and other PTOs for that matter) is not adversely impacted by the conversion.

4.1.1. Procedures for conversion

A contract rights-holder wishing to convert its CTR to a FTO will need to complete the following steps before the auction. (Note: the following procedures assume that the rights-holder would be a transmission customer and that the customer would need to have an appropriately defined business relationship with RTO West at the time of conversion. A fundamental premise is that conversions are done for a specified term. Upon expiration of the FTO conversion term, the rights revert back to the original CTRs, if still in effect.)

4.1.1.1. Single Feasible Dispatch

To convert a CTR to an FTO, the rights-holder must select a single feasible dispatch for each month[15] (for both on-peak and off-peak) that is within its transmission rights over the six-month period covered by the auction. The rights-holder may specify full conversion of a CTR for the six-month block or may specify a partial conversion.

Partial conversion may be temporal (selecting specific months within the six month block to do a full conversion) or may be in terms of a percentage of rights (or both). In the percentage of rights model, the rights-holder will specify what portion of its CTR will be converted to an FTO with the remaining CTR adjusted so that the sum of the FTO and the adjusted CTR does not expand the rights under the original CTR. The way the rights-holder defines its CTR will affect the amount of increase in liquidity and potentially the amount of incentive. It may be necessary for RTO West to limit the rules for partial conversions to the extent needed to keep them workable.

[***NOTE:*** *The process of segmenting or reconfiguring FTOs from one set of nodes to another set or to a hub-to-hub set is detailed elsewhere in this document.*]

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[15] An open issue is the granularity of the sale period? Can FTOs be sold in weekly blocks? Daily blocks?

4.1.1.2. Submit conversion request to PTO for approval

The rights-holder must take steps to assure that the balance of obligations and assets reflected in the PTO's catalogue is not adversely affected. It may do that by either making arrangements with RTO West that will in essence keep the PTO neutral or in the alternative submit its proposed FTO and adjusted CTR (if a full conversion is done the adjusted CTR would be a null set) to the PTO holding the CTR. If arrangements with RTO West have not been made, the rights-holder must get the PTO's agreement that the new set of FTOs and CTRs are within the original CTR and if curtailment rights on the CTR were included in the PTO's catalogue of assets, its approval on how the rights-holder would honor its obligations for curtailment.[16] The PTO's authority to deny the request is limited to that scope.

4.1.1.3. Submit conversion request to RTO West for approval

The rights-holder must submit the agreed upon FTO and adjusted CTR package to RTO West for approval. RTO West shall verify that such conversion is feasible and if liquidity is needed, what the potential benefit to liquidity is for the conversion (to be used as the basis of any potential incentive compensation).

4.1.1.4. Record Adjusted CTRs and FTOs

RTO West and the PTO must adjust the PTO's catalogue of obligation and assets to reflect the conversion.

4.1.2. Conversion Rules[17]

For most CTRs the conversion rules will be the same since the act of cataloguing obligations standardizes the transmission rights to a great extent. The standard rules are described in the Procedures for Conversion section above.

4.1.2.1. For load serving obligations or contracts.

Significant further work is needed on rules for converting network contracts and other "load-serving" contracts. If it can be made feasible from administrative, operational, and economic standpoints, it may be possible to develop procedures that allow rights holders to relinquish flexibility and sell forward the capacity that is freed up as a result. If feasible, the rights holder

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[16] When the rights-holder converts a contract that has curtailment rights for the PTO it must either pass along such provisions to the purchaser of the FTO or stand ready to satisfy the curtailment risk in some fashion that is acceptable to the PTO. Since FTOs and an accept all schedules model creates a product that is in essence firmer than the curtailable CTR, someone must take on the obligation for curtailment if the PTO exercises such an option.

[17] We need to think through interaction with pricing model and how to create long-term multi-year rights.

would be able to decide how much of the contract and for how long it will implement the "partial" conversion. *[The idea about possible "partial" network contract conversion would require a robust verification mechanism. It will work only if we figure out how to address the revenue adequacy problem and design conversion rules that prevent gaming and avoid the danger of unintended consequences (such as throwing off the expectations about actual dispatch of schedules under network contracts on which RTO West relied to predict future available capacity).]*

4.1.2.1.1. Load Serving Obligations (LSO)

Conversion rules for LSOs will be significantly influenced by the retail access policies of the appropriate regulators. In general, the rights-holder and the PTO will determine the rights-holder's catalogued rights, then the rights-holder will select a single feasible dispatch from those rights under which it will receive FTOs and go through the approval process described above.

4.1.2.1.2. NT

The rights-holder may fully or partially convert its NT contract using the standard rules.

The rights-holder can either aggregate its load busses and generator busses into hubs that meet the definition of market hubs and be issued FTOs between these hubs that are consistent with the underlying contract or it can select a single feasible dispatch between discrete busses that is supported by those rights. The conversion will go through the approval process described above under the section concerning conversion of load service obligations.

4.1.2.1.3. GTA

The transmission rights associated with delivery on the Transfer Provider's system are linked to the conversion status of transmission on the GTA holder's system (Full or partial conversion of GTA transmission would require equivalent conversion of the rights used to wheel across the originating PTO). When a rights-holder whose PTO holds a GTA on its behalf converts its service to FTOs, the PTO holding the GTA will do a partial conversion of the GTA on behalf of the rights-holder.

4.1.2.2. For Demand-Based Contracts

The rights-holder may fully or partially convert its demand-based contract using the standard rules. In the event that a demand-based contract has properties similar to a bi-directional, simultaneous "ownership-based" contract, the translation rules for a bi-directional, simultaneous "ownership-based" contract would apply.

4.1.2.2.1. Single POD/POR

In point-to-point contracts with a single POD and a single POR, there is no optionality to lock down, so the resulting FTO looks exactly like the underlying CTR (for a full conversion).

4.1.2.2.2. Multiple POD/POR

The rights-holder may fully or partially convert its demand-based contract using the standard rules.

4.1.2.3. For Ownership Arrangements

The rights-holder may fully or partially convert its ownership/leased-based contract using the standard rules with limited exceptions (see below).

4.1.2.3.1. Bi-Directional and Simultaneous Use

The rights-holder may fully or partially convert its contract using the standard rules except that the CTR should be first translated into two separate CTR with the path rating for each direction establishing the maximum injection and withdrawal amounts (in the earlier example one CTR would be 100 MWs injection at A and withdrawal at B, and the other would be a 75 MW injection at B and withdrawal at A). The full or partial conversion would then be applied to either or both CTRs. The conversion must recognize the interdependence of simultaneous use so that it does not create more FTOs than the rights underlying the contract.

4.1.2.3.2. Bi-Directional and Non-Simultaneous Use

The rights-holder may fully or partially convert its contract using the standard rules.

4.1.2.3.3. Uni-Directional Use

The rights-holder may fully or partially convert its contract using the standard rules.

4.1.2.4. Regional Coordination Agreements (PNCA and MCHC)

Given the complexity of these agreements and the potential that there may be no charge for transmission used by these agreements, conversion of these agreements to financial transmission options is not allowed.

4.2. Incentives to Improve Liquidity

Although tradability in of itself is an incentive for some rights-holders to convert CTRs to FTOs, RTO West may at times, want to provide additional incentives that recognize actions that increase liquidity. If there is sufficient liquidity present RTO West may not need to take any action. If additional liquidity is desired, RTO West may want to provide incentives for holders of CTRs to convert to FTOs or take some other action that would increase liquidity.

4.2.1. Guiding Principles

4.2.1.1. Incentives Should Be Commensurate to the Increase in Liquidity.

Partial conversions that add little to liquidity should get far less incentive than total conversions that locks down optionality. Furthermore, locking down optionality (without necessarily converting to an FTO) on a highly flexible contract may provide greater liquidity than converting a contract with limited flexibility.

4.2.1.2. Costs of Incentives Should Be Borne by Those That Benefit from Liquidity.

Costs of Incentives should be born by those that benefit from liquidity. Funding to pay for incentives will come from designated portions of auction revenues that result from sales of FTOs made available by the incentives.

4.2.2. Actions eligible for incentives

4.2.2.1. Conversion of CTRs to FTOs

Conversion of CTRs to FTOs may be eligible for incentives. The size of the incentive will be determined by RTO West in its determination of liquidity benefits.

4.2.2.2. Non-conversion commitments that increase liquidity

Any commitment taken by a rights-holder that has the effect of assuring RTO West that it can release additional FTOs for auction (e.g. locking down optionality) may be eligible for incentives.

5. FTO Auctions

This section provides an overview of the FTO auction process (Section 5.1), a more detailed example describing how to construct an auction (Sections 5.2 through 5.5), a description of the rules that govern secondary trading of FTOs (Section 5.6) and provides a definition of liquidity and the appropriate RTO actions related to enhancing liquidity should they be required (Section 5.7).

5.1. **Primary FTO Auction Overview**

The FTO auction facilitates the auctioning of financial hedges based on the transmission capability that remains on RTO West Transmission System after all CTRs and all existing FTOs have been accounted for.

This transmission capability is created from the following six categories or actions: (1) existing uncommitted transmission (2) capacity released by the expected netting of pooled unconverted

rights, and a combination of RTO's solicitation of (3) forward inc/dec bids, (4) expected counter-flow schedules, (5) expected releases by existing contract holders, and (6) expected new projects.

During the majority of cases, we expect that the use of the six categories will: (1) enable those who want to use the transmission system will be able to obtain hedges against that use and (2) cause hedging capability to be allocated to those who value it most during the times when it is limited. The process we describe below allows RTO West to accomplish these two goals without imposing unreasonable levels of costs or risks on existing users of the system.

To the extent that RTO West needs to take actions (like take on more risks) to add liquidity it will do so in a way that assures each PTO that its balance sheet of cataloged obligations and assets will not be adversely impacted over some reasonably long period.

RTO West should attempt to efficiently utilize the capability of the transmission system. At initiation of commercial operations, RTO West will begin the auction process using a relatively simple process of maximizing the throughput of the system beginning with the auction of longer-term strips of FTOs, for example a six-month strip six months ahead of real time, and releasing subsequent smaller strips of FTOs in auctions closer to real time. As RTO West gains more experience with the auction process, it should make the appropriate modifications to operate within its congestion management budget. This budget is a surplus that is created from the congestion management process. In choosing between pairs of products it can offer (A to B or B to C) it should attempt to maximize the value of its product.

RTO West will develop a revenue adequacy formula designed to assure that it has sufficient tools, flexibility and assets to fulfill all of its existing financial obligations in addition to the needs of any new requests. RTO West will have the ability to impose a charge (like a sales tax) on FTO buyers and sellers for the FTOs auctioned to assure that it has sufficient revenues to cover its costs of meeting any new obligations. In short, it will manage congestion to produce a targeted cost for managing congestion.

RTO West's net revenue associated with managing the costs of managing FTOs is the sum of the following:

- Profit or loss from the creation and sale of additional FTOs that have higher or lower value than the actual congestion costs.
- Profit from the auction settlement.[18]

[18] RTO West likely makes a profit if it uses a pay-as-bid system for paying the winning FTO sellers and imposes a small charge on FTOs auctioned.

To the extent that RTO West needs to take actions (like take on more risks) to add liquidity it will do so in a way that assures each PTO that its balance sheet of cataloged obligations and assets will not be adversely impacted over some reasonably long period. Any costs directly attributable to those who want RTO West to take additional risk will be borne by those participants. RTO West will not adjust auction prices or congestion prices after the close of the auction or the close of real time operation period. The revenue adequacy test should be conducted on a sufficiently long enough period to allow RTO West to use its tools to adjust future prices and quantities of FTOs to meet its revenue adequacy goals.

RTO West will account for FTOs released to enhance liquidity (and the assets to support them) separately from the PTOs' catalogues.

5.2. Auction Time Line

- RTO West will hold FTO auctions on at least a monthly basis.
- Before the start of an FTO auction, RTO West opens the auction quoting period and auction participants may submit bids to purchase and offers to sell FTOs.
- RTO West will post preliminary results and allow a period following that posting for bid revisions.
- The auction closes **[time period]** before the start of the period covered by the rights to be auctioned.
- RTO West performs the FTO auction clearing analysis (described below).
- RTO West will post the results of the auction within **[time period].**

Auctioned FTOs are redeemed in the same manner as FTOs acquired through the conversion of CTRs.

5.3. Primary Auction Example

5.3.1.1. "Judgment" on How Much to Auction

In order to take advantage of "diversity and flexibility," RTO West must accept the risk that the auctioned FTOs will lead to increased congestion costs during some hours. The more FTOs auctioned, the greater the risk of congestion because the FTO buyers reveal their expected demand for limited transmission capacity. RTO West relies on the market to decide how many FTOs should be sold in each auction.

Building a Supply Curve

When building a supply curve RTO West must take into account: (1) the expected netting of pooled unconverted rights and a combination of RTO's solicitation of (2) forward inc/dec bids, (3) expected counter-flow schedules, (4) expected releases by existing contract holders, (5) expected new projects, and (6) existing uncommitted transmission.

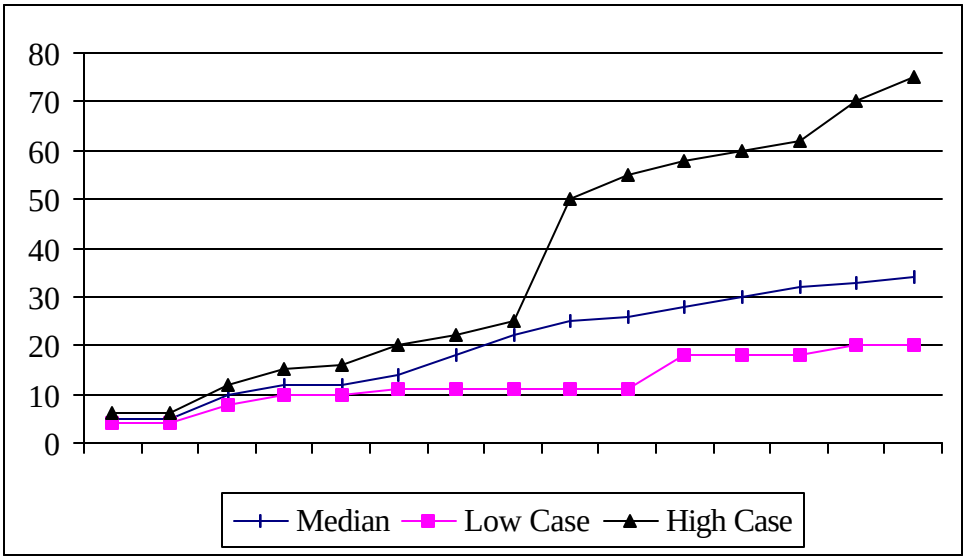
The assumptions RTO West makes will inevitably contain error, making it impossible to perfectly identify the inc/dec bids needed to fully protect RTO West from risk in selling an FTO. There may also be a lack of liquidity in the forward inc/dec market that causes RTO West to use projections of inc/dec costs rather than actually securing the forward inc/dec. To the extent RTO West is projecting these prices for incs/decs it is taking on risk, it cannot price the next MW of supply - it can only estimate it. When RTO West is estimating the supply curve it needs to include that risk in it's pricing. RTO West's tolerance for risk will depend on a number of factors: including the timeframe of the FTO and the perceived price volatility of incs/decs for that FTO. All other things equal the risk should be similar to the standards set to secure PTO obligations for pre-existing contracts. RTO West will want a high degree of certainty that the price received for the FTO will meet the cost of providing it.

Figure 1 below describes 3 supply curves for FTOs. They reflect the actual real time costs of congestion, after RTO West meets all existing obligations. The top line describes RTO West's most conservative case. The middle and bottom lines are its expected and lowest cases, respectively.[19]

RTO West should manage its construction of these scenarios to effectively manage its congestion budget to meet its target. For example, if its congestion management budget were $5 million, and its net revenues were greater than the target, it could adjust its prices and quantities of future FTOs using a less conservative scenario (e.g., blue line) to increase liquidity.

[19] If RTO West's experience is that the supply of incs/decs runs out or becomes highly volatile at some point on the supply curve it will not be able to offer FTOs beyond that point (the supply curve effectively becomes vertical).

Figure 1



Description of the forward redispatch market:

- RTO West solicits voluntary inc/dec bids, which state the amount of MW available and the price above which the bidder is willing to sell. RTO West may need to transform the inc/dec bid information into FTO equivalents.

- These redispatch bids must then be combined with the other five sources of supply described above in the first paragraph under the heading "Building a Supply Curve."

- Supply aggregation: At the end of the solicitation period, RTO West aggregates the FTO supply to form the aggregate supply curve for a set of potential FTO transactions. The aggregation process will consider the expected inter-dependence of transactions.

- Posting of the aggregate supply curves: If there are multiple rounds, RTO West posts the aggregate supply curves at the end of each round during the solicitation period.

- Bid adjustment. During the solicitation period, a seller can revise its supply bid if the adjustment (1) increases the bid quantity at the same price; or (2) reduces the bid price for the same quantity.

Building a Demand Curve

The auction bids are ordered by descending "limit price" to form a FTO demand curve. An FTO buyer can submit a "market price" bid and such market price bids form the vertical segment of the FTO demand curve.

- Solicitation of FTO buy bids. On day (-X), RTO West invites potential FTO buyers to submit binding buy bids for specific FTOs. Invitation ends on day (-XX). A buy bid can be a limit price bid or a market price bid.

- Demand aggregation. At the end of each round during the solicitation period, RTO West aggregates the FTO demand bids to form the aggregate demand curve for a given FTO. The aggregation process will consider the expected inter-dependence of transactions.

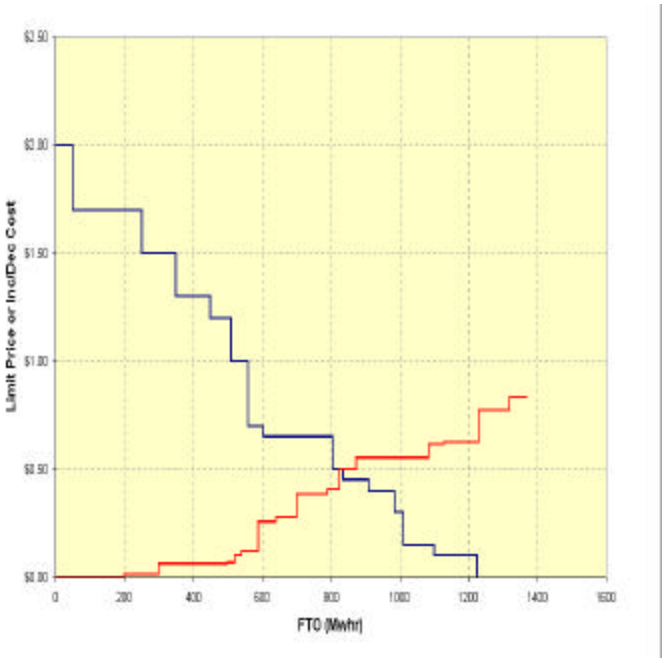
- Posting of the aggregate demand curves. If there are multiple rounds RTO West posts the aggregate demand curves at the end of each round during the solicitation period.

- Buy bid adjustment. During the invitation period, a FTO buyer can revise its buy bid if the adjustment increases the bid price for the same quantity.

The Supply-Demand Curve

The intersection of the two curves as shown in Figure 2 below, identifies the potential number of FTOs that RTO West could sell, taking into account its risk tolerance. The intersection also identifies the price that bidders pay for the FTOs

Figure 2



- Determination of winning bids. After the solicitation period on day (-XX), RTO West determines the winning bid pairs by setting a price P such that (a) a winning sell bid has a bid price at or below P; (b) a winning buy bid has a bid price at or above P; and (c) the number of FTO under (a) = the number of FTO under (b).

- Announcement of auction results. On day (-XX+1), RTO West announces the auction results by posting the price P and the number of FTOs auctioned. RTO West also notifies the winning bidders.

- Auction settlement. All winning FTO buyers pay price P. Each winning FTO seller receives either its actual bid or P. RTO West may impose a small markup (markdown) (e.g., 1%) on the price paid (received) by the FTO buyers (sellers).[20] Auction settlement (different from congestion settlements) occurs after the winning quotes have been accepted and verified.

5.4. FTO Segmentation

An FTO holder may segment an FTO by selling that FTO and buying the corresponding segments it desires. The net cost (or net revenue) from doing so will be observable in the

[20] An auctioneer (e.g., Ebay and Christie) often users this kind of charge to cover its O&M costs and make a profit.

intermediate auction results. Since the auction process is already taking simultaneous feasibility into account, no additional testing is required.

This requirement is not intended to restrict transactions in the secondary market. Scheduling Coordinators can undertake an unlimited number of subsequent Scheduling Coordinator-to-Scheduling Coordinator trades to take on obligations that can be hedged with the FTO.

[***NOTE****: We need further discussion about whether there could be other workable ways for RTO West to facilitate segmentation. In our view, a workable solution would have to be one that does not have a negative impact on RTO West or other transmission rights holders.*]

5.5. Auction Business Rules

The following information summarizes RTO West's FTO auction business rules:

- An auction participant must be an Eligible Customer or an RTO Transmission Customer (as those terms are defined under RTO West's tariff) to be eligible to submit bids or offers into the FTO auction.

- Auction participants cannot submit offers to sell FTOs that they do not own or cannot create by such actions as generation redispatch or counter-flow scheduling at the time of the bid submittal.

- Invalid quotes into the auction are rejected. These quotes may be resubmitted and if time-stamped as received by RTO West before the close of the auction quoting period are included in the auction.

- All FTOs that were converted from CTRs (during the auction quoting period) and have a status of approved and confirmed by the customer at the close of the auction quoting period are modeled as injections in the auction analysis and not offered for sale in the auction.

- Any FTO request that is approved by RTO West, but not confirmed by the customer by the close of the FTO auction quoting period, is deemed to be withdrawn.

5.6. Secondary Market

5.6.1. FTO Secondary Markets Overview

FTOs may be traded on the secondary market.

RTO West secondary market is a bilateral system that facilitates the trading of existing FTOs between Eligible Customers.

The following is a list of business rules and guidelines for secondary trades:

- The FTO secondary market allows trading of existing FTOs as long as their attributes remain the same. FTOs cannot be reconfigured in the secondary market. As long as RTO West is only responsible for the FTOs from the existing contracts and auction, others can buy and sell the derivatives based on these underlying FTOs.

- Anyone can buy and sell FTOs in the secondary market (but only Transmission Customers or their Scheduling Coordinators can redeem them).

5.6.2. *What is a Market Hub?*

[***NOTE:*** *This is one possible definition:*]

A market hub is a convenient location to exchange energy and it represents a collection of busses that have approximately the same incremental prices for the congestion related inc/dec market.

5.6.3. Tradable Transmission Between Market Hubs

FTOs are tradable between hubs to the extent that RTO West has made them available in the primary auction. However, other FTOs may be used to offset the congestion cost one may see between any pair of hubs. FTOs between hubs will be tradable in the secondary FTO market. There are not limits applicable to trading hub-to-hub FTOs other than those that apply to all FTOs generally.

5.6.4. Managing Congestion Within a Market Hub

Since the congestion settlement is done on a bus-by-bus basis, any congestion costs within a hub are charged to those scheduling between the busses within the hub.

[***NOTE:*** *This language presumes that injection points would be defined as busses, which we're not sure about yet.*]

5.6.5. Market Hub Development

Since market hubs are a convenience for the market, they will arise naturally as trading on the system increases. Therefore, there will not be an initial identification of hubs.

5.6.6. How Are Hub to Hub Rights Created?

Hub to hub rights are created through either the primary RTO auction, converting a Network contract into and FTO or by translating a node-to-node FTO into a Hub-to-Hub FTO. The translation of node-to-node FTOs can be done either through the mechanism described in Section 5.4 concerning segmentation or by having RTO West do the translation. If RTO West does the translation, the resulting hub-to-hub rights should not create any more value than the node-to-node rights being translated and meet RTO West's feasibility test.

5.7. Liquidity

The "accept all schedule requests" form of congestion management allows virtually all those willing to pay the market value of transmission to make their transactions using a combination of the primary auction, secondary markets and day ahead scheduling process. Liquidity becomes a problem with either:

1. RTO West is pricing its FTOs out of the market and collecting excess rents.
2. There is insufficient supply

If the source of the problem is due to (1), RTO West will adjust its FTO auction parameters to assure that it is meeting its congestion management budget. If it is already meetings its budget, it can develop new products as described in the Convergence document (Tools 1 through 4) as long as the customers who are benefiting from this change pay for any impact that this will have on the budget.

If there is a real lack of physical supply, RTO West should assure that it is getting all available incs and decs from potential suppliers and invoke any transmission expansion process (if any) it has at its disposal.

6. Day-Ahead, Real-Time Markets and Scheduling Settlement

On Day One of RTO West operations, there will be both day-ahead and real-time re-dispatch markets, in which Scheduling Coordinators with dispatchable loads, generators and schedules that satisfy the relevant technical requirements may participate. The market will be comprised of voluntary "inc/dec" bids. The "incs" will effectively increase injections at a node for payment by RTO West to the Scheduling Coordinator, and the "decs" will effectively reduce injections at a node for payment by a Scheduling Coordinator to RTO West. RTO West may accept as inc/dec bids any reasonable offers by Scheduling Coordinators that, in RTO West's judgment, can effectively facilitate congestion management without jeopardizing system reliability.

RTO West will not, however, run a day-ahead energy market, which means that RTO West will not act as a buyer or a seller in the day-ahead energy market. All Scheduling Coordinators will be required to submit balanced schedule requests, which means that each Scheduling Coordinator's injections and withdrawals are equal on an hour-by-hour basis and at the end of the day ahead scheduling process, they will have all necessary schedules confirmed.

An Ancillary Services market will be established, within which self-tracking/self-provision of IOS (Interconnected Operations Services) will be allowed.[21]

[21] How self-tracking and self-provision will work with respect to the allowed changes to schedules will need to be addressed.

While completing work on congestion management and ancillary service markets, RTO West should avoid market designs that would transfer bids from one market into a different market in a way that changes the characteristic of the intended product. For example, if a utility bids capacity into a reserve market, perhaps RTO West should be prohibited from exercising that bid to get energy for balancing or congestion clearing. This is because the bid was intended for reserve capacity and not intended to provide a substantial delivery of energy. Clearly, at least the balancing energy and congestion redispatch markets are closely related and it may be difficult or inappropriate to fully separate these markets, but still, the design should seek to avoid delivering unexpected results to bidders.

[***NOTE:*** *Can we write this so it does not preclude RTO West from running a simultaneous auction where the winners can be used for lower quality service, if this is lower cost to RTO West? RTO West should be prohibited from using a lower quality product for a higher quality product. This will prevent the problem that California saw in gaming between products and prices for lower quality that were higher than the higher quality.*]

6.1. Scheduling overview

6.1.1. Balanced schedules received from Scheduling Coordinators

Scheduling Coordinators will submit balanced schedule requests. A schedule is balanced when the withdrawal of energy in each hour is matched by an equal quantity of energy injected from the resource.

Scheduling Coordinators do not require CTRs or FTOs to cover all of the schedules submitted. Scheduling Coordinator with schedules that are not covered by CTRs or FTOs can qualify their schedule requests by specifying a maximum price they are willing to pay for their share of any congestion cost associated with the schedule. RTO West will receive all balanced schedule requests correctly submitted, and, subject to technical feasibility and its ability to satisfy the request at a price that is acceptable to the Scheduling Coordinator, will execute the accepted schedule requests.

6.1.2. Schedules by Bus

Schedules of injection and withdrawals will be specified by bus or hub. Each Scheduling Coordinator must balance its scheduled injection and withdrawals for each scheduling hour.

6.1.3. Schedules in three categories:

6.1.3.1. Covered by CTRs

Schedules submitted by Scheduling Coordinators that are covered by CTRs will not be exposed to any RTO hourly congestion clearing charges net of the credits they receive, except to the extent that the Scheduling Coordinators makes changes to its preschedule during the

Schedule Adjustment Period or during Real-Time Operation and the changes extend outside of the CTRs "deadband," as discussed later. Schedules for CTR load service within RTO West control area may consist of a portfolio of loads balanced by a portfolio of resources. CTR-covered schedules must conform to the provisions of the pre-existing contracts.

6.1.3.2. Covered by FTOs

The treatment of schedules submitted by Scheduling Coordinators holding FTOs is nearly identical to the process as those with CTRs. Schedules submitted by Scheduling Coordinators holding FTOs will be exposed to RTO West hourly congestion charges appropriate to that schedule. The FTO may produce credits in any hour for the Scheduling Coordinator holding that FTO that can be used to offset the holder's congestion charges in that hour. There are no "deadbands" associated with the use of FTOs. Schedule adjustment changes during the schedule adjustment period are subject to applicable congestion charges. There is only one difference between the treatment of Scheduling Coordinators who schedule with CTRs and those who schedule with FTOs.[22] The CTR users may have the ability to adjust their schedules during the schedule adjustment period and not have to pay for any of the associated congestion costs, if the changes are within their defined deadband.[23]

[Question: There is one additional difference between the CTRs and the FTOs. You can get credits on FTOs when not using the exact pairs you have purchased, but you can't get a credit when your schedule does not conform to the CTR.]

6.1.3.3. Uncovered

Scheduling Coordinators submitting a schedule as "market price" are indicating to RTO West that they will accept appropriate congestion clearing charges, regardless of the cost.

Scheduling Coordinators submitting a schedule with a "limit price" are indicating to RTO West that they will "self-clear" (automatically withdraw that schedule) when the expected clearing costs in the Day-Ahead Period exceed the limit price. Congestion costs are expected to vary hour-by-hour, so that some hours may "self-clear" and other hours may not. Limit prices should also be applicable hourly for that reason.

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[22] To continue to provide service that is defined by the original non-converted and non-standard contracts, the catalogue process describes exceptions to this general rule under Special Rules, section _____.

[23] This assumes that the existing PTO has provided the necessary assets to allow this to happen without imposing costs on other customers. See Section 3.____.

6.2. Day-Ahead Re-dispatch Market

Scheduling Coordinators may voluntarily provide inc/dec bids to RTO West in the early hours of the Day-Ahead Period P to assist in clearing congestion.[24]

6.2.1. Computing Congestion Management Costs and Charges

The procedure is designed to achieve a number of objectives:

(i) to allow schedules with CTRs to meet their load service obligations from existing resources at no significantly increased cost of congestion;

(ii) to accept all schedule requests from new entrants and those scheduling outside of their CTRs and, within the scope of RTO West's congestion management scheme, to allow system access to those who value it most;

(iii) to honor the financial hedges associated with the FTOs that accompany some uncovered schedules; and finally

(iv) to set and recover congestion management charges from Scheduling Coordinators such that RTO West's congestion management accounts are consistent with its congestion management budget. At the opening of DASP (9am D-1?), RTO West will accept schedule requests from Scheduling Coordinators.[25] These will have two flavors: those that are covered with either CTRs or FTOs (which simply specify the quantity to be scheduled, the PORs and the PODs) and those without rights who additionally specify a price which is the maximum $/MW per hour of congestion charge the Scheduling Coordinators are willing to pay for their schedule to be executed. This price may be a limit bid, or a market bid (equivalent to a no-limit bid).[26]

[***NOTE:*** *How to handle scheduling against CTRs that are subject to curtailment rights is something that has to be worked out.*]

At the same time, RTO West receives inc/dec bids from generators and dispatchable loads.[27] Except under emergency operating conditions, the bids are voluntary, as RTO West cannot force a generator to trade.[28]

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[24] A Strawman Proposal for the Scheduling Process is included as Appendix D. This proposal is included merely to illustrate how the flow of the process might work.

[25] Open Question is does Scheduling Coordinator submit 24x1Hr schedules for the day ahead? Or is this a rolling DASP window? Needs to be considered in context of Scheduling Timeline: working assumption is 24x1Hr schedules for next day.

[26] Effect of market bid is to give all such bids equal ranking for system access. No problem unless and until RTO West can't find enough re-dispatch to accommodate market-price RTSs (Requests to Schedule), when it needs to devise a rule to decide which of these to curtail.

[27] Hereinafter, references to inc/dec generators will be understood to include dispatchable loads.

RTO West processes these schedule requests to identify (i) where it expects an energy shortfall (its own forecast of load to be served versus Scheduling Coordinators') and (ii) the location and severity of congestion it expects to be caused by the schedules. Using an approximate congestion management model, RTO West computes the indicative cost of clearing the expected costs of congestion and meeting the energy shortfall, and publishes all available information [on its website] in order to allow all Scheduling Coordinators to modify, withdraw or re-submit their request to schedule.

This cycle of bid submission, computation of indicative congestion and cost, and bid modification and re-submission will repeat at defined intervals during the DASP, until at some time (3PM D-1 for final lockdown) all schedules are locked down. From this time on, no schedule adjustments are allowed, except those within the deadband and those that don't increase congestion. Alternatively, we may allow schedule adjustments outside of any applicable deadband that do increase congestion, provided the Scheduling Coordinators submitting these agree to pay any additional cost of congestion. At this stage, RTO West makes a final assessment of the volume and location of expected congestion, calculates the cost of clearing this (the Congestion Clearing Price) and determines which schedule requests can be accommodated at this price. It will also identify what resources need to be committed to meet its forecast of energy shortfall, consistent with not aggravating congestion.[29]

At the end of DASP, RTO West will re-dispatch generators whose inc/dec bids it has accepted, and compute the cost of congestion re-dispatch to allow the firm schedules to flow.

RTO West will then calculate the shadow price of congestion across the congested paths/ circuits, and will reflect this onto every other node in the network to develop a set of nodal congestion prices. It will publish [on its website] the DA congestion prices.

Using the nodal prices, RTO West charges Scheduling Coordinators for the full amount of the congestion charge incurred by their schedule as submitted (scheduled quantity times nodal price difference across the PORs/PODs). In order to receive a credit against their congestion charges, Scheduling Coordinators with CTRs or FTRs that support their schedules must submit them to RTO West at this time: no CTRs or FTOs can be submitted after the initial lockdown [this should be sufficiently early to develop an effective day ahead RTS market-may have initial and final to provide flexibility]

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[28] The question remains what does RTO West do in the face of unmanageable congestion? Also, what reserve power will RTO West have to instruct a generator to change its output: and what effect this has on a generator's imbalance revenue/charge? .

[29] These are not separate tasks: we assume that RTO West will use a security-constrained LP to find the least-cost resource re-dispatch that balances the system without violating any network or resource capacity limit.

Scheduling Coordinators with CTR-supported schedules get a 100% credit, computed as the schedule times the POR/POD nodal price difference. For those with FTO-supported schedules, the credit is the FTO face value times the price difference of the nodes between which it applies. In no case will the total amount credited to a Scheduling Coordinator exceed the gross of it aggregate congestion charge.

6.2.1.1.1. Real-Time Re-Dispatch and Paying for Congestion

In real time, RTO West has the option to manage expected congestion by re-dispatching generators under the prevailing system conditions: either from those resources with whom it has placed Call/Put Options to meet unexpected deviations between the forecast and what actually occurs, or others based on a new set of market based bids if the market price is advantageous. This process occurs up to some lock down time (T-120).

Assuming RTO West did take action to relieve anticipated congestion, it will settle with those generators who were re-dispatched according to the quantity re-dispatched and the contract price.[30]

RTO West will then calculate the shadow price of congestion across the congested paths/ circuits, and will reflect this onto every other node in the network to develop a set of nodal congestion prices. It will publish the hourly nodal/hub congestion prices.

Using the nodal prices, RTO West charges Scheduling Coordinators for the full amount of their congestion charge (scheduled quantity times nodal price difference of PORs/PODs). Scheduling Coordinators with CTR-supported schedules get a 100% credit, computed as the actual schedule times the POR/POD nodal price: for those with FTO-supported schedules, the credit is FTO face value times the price difference of the nodes between which it applies.

Residual congestion balances (due to forecasting error or changed system conditions, tolerated deviations from schedules, the opacity of RTO West's crystal ball, etc) may occur. It is proposed that this balance be tracked through a balancing account. These funds will be pooled with other congestion management revenues and costs and effectively managed by RTO West as part of its overall congestion management budget target.

[30] This needs more detailed work. Can it be managed via the Imbalance Energy Settlement? What about the cumulative effect of successive re-dispatch instructions? An alternative might be to settle re-dispatch bids on a "clearing" price basis. This needs more work to determine if it is more efficient, lower cost, more/less prone to gaming than "as-bid."

6.2.1.2. Schedule Adjustment Period

The Schedule Adjustment Period begins at the end of Lock-Down and extends until [#minutes2] minutes prior to the hour of delivery for that schedule. During this period, schedule changes will be accepted by RTO West under the following provisions:

- Schedule changes that do not create congestion will be accepted as submitted.
- A scheduling coordinator making a schedule change which will increase congestion will pay for the incremental congestion costs, with the following exceptions:
- If the schedule change creates additional congestion and the cataloguing process identifies the non-converted contract as having defined flexible rights, the scheduling coordinator can make changes within a defined deadband without being charged for RTO congestion clearing costs
- Scheduling coordinators experiencing a bona fide contingency due to a forced outage of generation or transmission, or an uncontrollable loss of a scheduled import or export, will have their requests for schedule changes accommodated to the extent possible. Scheduling Coordinators whose schedule of injections must be altered to conform to requirements imposed by regulatory entities. These requirements are frequently referred to as "non-power constraints".

Schedules do not become obligations, however certain increased scheduling costs may be borne by Scheduling Coordinators requesting changes to their preschedules.

6.2.2. Deadband for CTR Schedule Changes

Many pre-existing contracts underlying the CTR have flexibility built into them. A Network Integration Load Service contract under a PTO's former OATT certainly is one example of a contract that inherently assumes real-time flexible delivery service. This flexibility was needed to deal with the minute-to-minute variability of load across a network of transmission-distribution points of delivery, as well as to deal with energy service from a portfolio of generators and purchases. This flexibility normally came without exposure to incremental transmission costs on the Network Service provider's system.

In order to facilitate the market for FTOs, the utilities have agreed to expose some portion of this flexibility to RTO congestion clearing costs. The method for accomplishing this is to impose a "deadband" onto each contract's flexibility. When a contract allows an amount of flexibility to change schedules, the Scheduling Coordinator may make changes to that preschedule as needed. As long as the changes are within the contractual rights, then the Scheduling Coordinator will be exposed to congestion charges only reflecting the amount of change that exceeds the deadband.

There are many valid reasons for a Scheduling Coordinator to initiate schedule changes. Some of these are:

- *Inflow Forecast Error*
  There are some projects that must be run to a particular elevation. The output is contingent on the fuel supply. Those inflows can be forecast on a preschedule basis, but there will inevitably be volatility in that forecast. This type of adjustment should be part of the dead band.
- *Hourly Coordination*
  If price differentials may exist between Hourly Coordination projects significant dead band will be required to implement the Hourly Coordination Agreements. These agreements allow parties to adjust the real time output of each other's projects to enhance the overall capability of the system. If the Hourly Coordination projects are indistinguishable from a congestion cost perspective this issue may be moot.
- *Generation Optimization*
  Generation Optimization is the redistribution of scheduled generation across the system to optimize output.
- *Load Forecast Error*
  Operating day load forecast error.
- *Third party contracts for transmission*
  To the extent third party contracts allow for real time changes these changes need to be reflected as dead band in the catalog (unless the provisions are suspended).

7. Long-Term Rights

7.1. Long-Term Rights from Existing Capacity

From time to time, RTO West may offer long-term rights through auction to unencumbered system capacity that is available for a period of time longer than one year. The buyer will receive FTOs associated with the unencumbered capacity over the life of contract of sale.

7.2. Long-Term Rights from a Willingness To Pay Redispatch Costs

RTO West may enter into contracts for long term rights with an entity willing to pay all redispatch costs necessary to create additional system capacity to accommodate schedules defined by such rights under which such entity would receive FTOs associated with increased capacity over the life of the contract.

7.3. Long-Term Rights from Expansion

RTO West may enter into contracts for long term rights with an entity willing to pay for the installation of facilities that increase transmission capacity on the system under which such entity would receive FTOs associated with increased capacity over the life of the contract.

8. Interface with other entities

8.1. Seamless Operation with other RTOs

RTO West is developing a proposal to manage congestion between and among RTOs through a joint committee consisting of senior staff from each of the three proposed RTOs in the Western Interconnection, referred to as the Seams Steering Group—Western Interconnection.

8.2. Internal seams with non-participant utilities

RTO West will develop a proposal to manage congestion between control areas nested within RTO West service area.

9. Review

The Filing Utilities intend that RTO West Board of Directors (the "Board") will use its best judgment to balance two important goals for the congestion management system described in this paper: (1) providing adequate opportunity for the congestion management system and the markets that support it to mature and to work out initial minor "kinks"; and (2) protecting PTOs, market participants, end use consumers, and transmission system reliability from unreasonable exposure to harm if there are aspects of the congestion management system that prove unworkable.

The Filing Utilities therefore contemplate that the Board will have, from the beginning of RTO West's commercial operations, the authority to modify the congestion management approach set out in this document if circumstances warrant (subject to certain principles described below). If the Board sees no need for change, it need not make any.

At the end of three years of commercial operations, however, the Board will have an obligation to conduct a thorough, formal evaluation of RTO West's congestion management system. The Board will then need to decide whether it believes the best course is to continue with the congestion management system as then in effect or to modify it.

If the Board elects to modify the congestion management system (either during the initial three years of commercial operation or because of its formal evaluation at the end of three years), it must do so in a way that neither expands nor diminishes whatever transmission- or congestion-related rights are then outstanding (whether based on pre-existing contracts or load service

obligations or on FTOs purchases directly from RTO West or in the secondary market). In addition, any modified approach to congestion management the Board adopts must conform to the following principles:

a. accommodates broad participation

b. sends efficient price signals to all users about the consequences of their transmission usage decisions

c. the generation that gets re-dispatched (from the voluntary re-dispatch bid stack) is the least cost to relieve the expected congestion

d. transmission rights are used by those that value them most highly

e. sends signals for appropriate investment (generation, including generator location; transmission; demand-response; etc.)

f. facilitates development of hedging tools

g. liquidity and tradability

h. doesn't impede reliability

i. ability to detect and respond to gaming and market power abuse

j. broad seamless market

k. subject to "rationality" test – proportionality between costs incurred and benefits to customers

l. preserves protection to parties holding pre-existing transmission rights for the terms of those rights. [***NTD:*** *Is this last principle redundant with the first sentence of the lead-in paragraph?*]

Appendices

A Terms and definitions

Key Defined Terms and Acronyms

[***NOTE:*** *translations and references to sections where terms are defined to be added.]*

PTO
FTO
LSO
CTR
CTR Service Pool
RAS
Scheduling Coordinator
Eligible Customer
inc
dec
Good Utility Practice
DASP
LP
Congestion Clearing Price
RTS
OATT
Deadband
PNCA
MCHC
MW
Lock-Down
Board

B RTO West Congestion Management Maps and Examples

C FTO and Congestion Clearing Example

D Strawman Proposal for the Scheduling Process

Appendix D

Appendix D

Strawman Proposal for the Scheduling Process

Assumes that preschedules consist of 24 schedule-hour (adjusted for changes to/from daylight savings time) amounts in whole megawatthours each hour.

A schedule is balanced when each hour's energy requirement is matched by an equal energy resource.

Early a.m. preschedule day:

- RTO posts region-wide weather forecast and its hourly control area load forecast.
- Scheduling Coordinator provides to RTO an hourly load forecast for its retail loads within RTO control area, by "load zone" (collection of electrically similar transmission delivery buses). Load forecast should include distribution losses *and transmission losses*.
- Scheduling Coordinator provides to RTO hourly forecast of its wholesale energy obligations by delivery bus.
- Process begins for Scheduling Coordinator provision to RTO bids for Interconnected Operations Services (IOS) and inc/dec bids for congestion clearing.
    - The bids will be in the form of "incs", which effectively increase resources at a node in exchange for payment by RTO West, or "decs" which effectively decrease the resources at a node in exchange for payment by the Scheduling Coordinator to RTO West. Incs and decs may represent generation, loads or schedules of imports or exports, or any other means that provides the desired effect.
    - Bids are posted on website to provide transparent price signals

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Later a.m. preschedule day:

- RTO provides Scheduling Coordinators with estimated amounts of Ancillary Services (A/S) for which each Scheduling Coordinator will be responsible.

- Scheduling Coordinators make arrangements for A/S by self-provision, in bilateral markets, in A/S exchange or with RTO as provider of last resort.

    - Self-tracking Scheduling Coordinators are responsible for acquiring load following from other than RTO West.

- RTO posts differences between its own load forecast and those provided by Scheduling Coordinators.

Prior to Lock-Down time preschedule day:

- Scheduling Coordinators provide balanced preschedules to RTO:

    - Scheduling Coordinators responsible for retail load will provide preschedules of withdrawals by load zone and resource injections to balance the withdrawals. Resources may be injected at buses or hubs.

        - For load service covered by Catalogued Transmission Rights (CTRs), the Scheduling Coordinator may provide a prescheduled portfolio of injections and withdrawals, meaning that resources and loads do not necessarily need to have specific bus-by-bus pairing. However, this preschedule must be balanced and feasible within the provisions of all contracts underlying its CTRs and should reference the catalogue number.

        - For load service not covered by CTRs, the injections and withdrawals must be paired up.

    - Scheduling Coordinators scheduling wholesale transactions must provide similarly balanced injections and withdrawals. Injections and withdrawals may be bus-to-bus, bus-to hub, hub-to-hub or hub to bus.

        - Wholesale transactions covered by CTRs may also be handled on a portfolio basis, if that reflects the nature of the underlying transaction contract. The catalogue number must be provided at time of scheduling.

        - Those wholesale transactions not covered by CTRs must be scheduled by injection-withdrawal pair.

- Scheduling Coordinators may provide limit prices for their schedules that are not covered by CTRs. Schedules with limit prices will self-clear by being withdrawn automatically, if

those schedules would otherwise incur estimated congestion clearing costs above the limit price.

- RTO West accepts all preschedules that meet the above criteria.
- Scheduling Coordinators must also provide preschedules of Ancillary Services to meet the requirements indicated by RTO West.

<u>During Lock-Down on the preschedule day:</u>

- RTO West refuses to accept new schedules or changes to preschedules.
- RTO West evaluates scheduled grid operation for congestion and calculates and publishes node prices.
- RTO West informs Scheduling Coordinators whose schedules have self-cleared due to limit pricing.
- RTO West may begin to acquire inc/dec "calls" for the following day.
- [If a two-step settlement process for congestion management is used, RTO West will determine settlement charges]
- RTO West runs a system analysis to establish the baseline congestion costs for the purposes of determining incremental costs for schedule changes.

<u>During the Schedule Adjustment Period (preschedule day and into the Day of Delivery):</u>

- At the end of the Lock-Down period, the Schedule Adjustment Period begins.
- Scheduling Coordinators may provide RTO West with changes to schedules under the following rules:
    - All schedule changes that do not produce additional congestion will be accepted unconditionally.
    - Schedule changes that do produce additional congestion will be subject to the incremental costs of clearing the congestion, with the following exceptions:
    - For schedules covered by CTRs: If the schedule change creates additional congestion and the cataloguing process identifies the non-converted contract as having defined flexible rights, the scheduling coordinator can make changes within a defined

"deadband" without being charged for RTO congestion clearing costs. Note also that schedule changes that result in incremental congestion outside the deadband will be subject to charges only for the amount of congestion outside the deadbands.

- Scheduling coordinators experiencing a bona fide contingency due to a forced outage of generation or transmission, or an uncontrollable loss of a scheduled import or export, will have their requests for schedule changes accommodated to the extent possible.

- The Schedule Adjustment Period ends at XXX minutes before the beginning of the hour of delivery for the hourly schedule in question.

- Beginning YYY minutes before the beginning of each hour of delivery, RTO West begins to exercise its call options for congestion management and IOS, using the least-cost solution from the stacks of bids and its evaluation of the effectiveness of the offerings.

Real-Time Operation (from end of the Schedule adjustment Period through the end of the hour of delivery):

- RTO West dispatches its IOS and congestion management resources to effect the schedules and deal with contingencies.

  - Schedule changes may be requested by Scheduling Coordinators to deal with their own contingencies and unexpected load changes.

  - Schedule change requests purely for economic reasons should not be honored, unless allowed by pre-existing contracts, in which case deadband rules apply.

End-of-Hour Settlement Calculation Period:

- RTO West accumulates the data needed for settlements.

- RTO West accomplishes checkout with adjacent control areas. This will confirm the final import and export energy schedules to be used by RTO West for settlements with the Scheduling Coordinators.